SONY

SOLID-STATE MEMORY CAMCORDER

PMW-EX1R

WIDE CONVERSION LENS

VCL-EX0877

SERVICE MANUAL

1st Edition

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres. Pour toute réparation faire appel à une personne compétente uniquement.

注意

指定以外の電池に交換すると，破裂する危険があります。
必ず指定の電池に交換してください。
使用済みの電池は，国または地域の法令に従って
処理してください。

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
When you dispose of the battery, you must obey the law in the relative area or country.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Lorsque vous mettez la batterie au rebut, vous devez respecter la législation en vigueur dans le pays ou la région où vous vous trouvez.

VORSICHT

Explosionsgefahr bei Verwendung falscher Batterien.
Batterien nur durch den vom Hersteller empfohlenen oder einen gleichwertigen Typ ersetzen.
Wenn Sie die Batterie entsorgen, müssen Sie die Gesetze der jeweiligen Region und des jeweiligen Landes befolgen.

FÖRSIKTIGHET!

Fara för explosion vid felaktigt placerat batteri.
Byt endast mot samma eller likvärdig typ av batteri, enligt tillverkarens rekommendationer.
När du kasserar batteriet ska du följa rådande lagar för regionen eller landet.

PAS PÅ

Fare for eksplosion, hvis batteriet ikke udskiftes korrekt.
Udskift kun med et batteri af samme eller tilsvarende type, som er anbefalet af fabrikanten.
Når du bortskaffer batteriet, skal du følge lovgivningen i det pågældende område eller land.

HUOMIO

Räjähdysvaara, jos akku vaihdetaan virheellisesti.
Vaihda vain samanlaiseen tai vastaavantyyppiseen, valmistajan suosittelemaan akkuun.
Noudata akun hävittämisessä oman maasi tai alueesi lakeja.

FORSIKTIG

Eksplosjonsfare hvis feil type batteri settes i.
Bytt ut kun med samme type eller tilsvarende anbefalt av produsenten.
Kasser batteriet i henhold til gjeldende avfallsregler.

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Manual Structure

Purpose of this manual

The service manual is intended for use by trained system and service engineers, and provides the information of maintenance and detailed service.

Related manuals

The following manuals are available in this model.
If this manual is required, please contact your local Sony Sales Office/Service Center.

- **Operating Instructions (Supplied with unit)**
  This manual is necessary for application and operation of this unit.

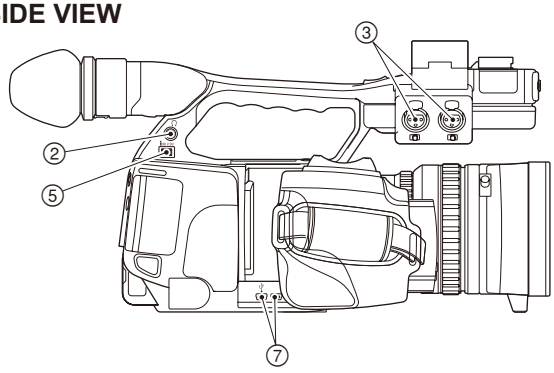
- **“Semiconductor Pin Assignments” CD-ROM (Available on request)**
  This “Semiconductor Pin Assignments” CD-ROM allows you to search for semiconductors used in Broadcast and Professional equipment.
  Part number: 9-968-546-06

Section 1
Service Overview

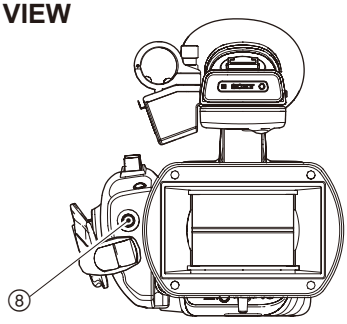
1-1. External Connectors

1-1-1. Signal Inputs and Outputs

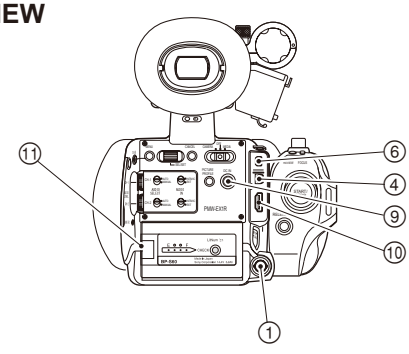
SIDE VIEW



FRONT VIEW



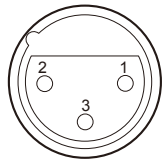
REAR VIEW



① **SDI OUT:** BNC type
SDI output signal

② **(HEADPHONES):** Stereo mini jack
Sound monitor, monaural/stereo selectable
−20.5 dBu (Reference level 16 Ω loaded)

③ **AUDIO IN CH-1, CH-2:** XLR (3P, Female)

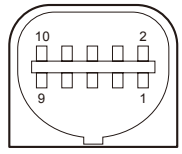


– **EXT VIEW** –

(0 dBu = 0.775 V rms)

No.	Signal	I/O	Specifications
1	MIC/LINE (G)	–	–65 dBu to –8 dBu
2	MIC/LINE (H)	IN	+4 dBu, selectable
3	MIC/LINE (C)	IN	High impedance, Balanced

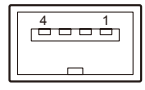
④ **A/V OUT:** Multiconnector (10P)



– **EXT VIEW** –

No.	Signal	I/O	Specifications
1	LINE_MONI1_L (A/V)	O	LINE OUT (L)
2	LANC_SIG	–	NC
3	S_GND	–	GND
4	LANC_DC	–	NC
5	S-C	O	NC
6	LINE_MONI2_R (A/V)	O	LINE OUT (R)
7	AV_SW	I	
8	VIDEO/AUDIO_GND	–	GND
9	VIDEO	O	Composite OUT
10	S-Y	O	NC

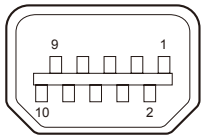
⑤ **HDV/DV:** i.LINK connector (IEEE1394, S400) (4P)



– **EXT VIEW** –

No.	Signal	I/O	Specifications
1	TPB–	I/O	Strobe on receive, data on transmit B (–)
2	TPB+	I/O	Strobe on receive, data on transmit B (+)
3	TPA–	I/O	Data on receive, strobe on transmit A (–)
4	TPA+	I/O	Data on receive, strobe on transmit A (+)

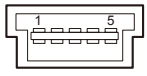
⑥ **COMPONENT OUT:** Mini D terminal (10P)



– **EXT VIEW** –

No.	Signal	I/O	Specifications
1	Y	O	COMPONENT (Y)
2	YGND	–	Y GND
3	PB	O	COMPONENT (Pb)
4	PBPR_GND	–	PBPR GND
5	PR	O	COMPONENT (Pr)
6	NC	–	
7	NC	–	
8	NC	–	
9	SW_GND	–	
10	SW	I	

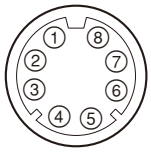
⑦ **(USB):** Mini-B connector (5P)



– **EXT VIEW** –

No.	Signal	I/O	Specifications
1	VCC	–	USB Vcc
2	D–	I/O	USB–
3	D+	I/O	USB+
4	ID	–	NC
5	GND	–	Ground

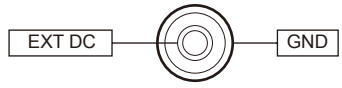
⑧ **LENS REMOTE:** (8P FEMALE)



– **EXT VIEW** –

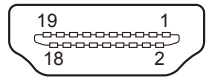
No.	Signal	I/O	Specifications
1	COMMON–V	O	GND
2	ZOOM	I	GND: WIDE 1.66V: STOP 3.33V: TELE
3	COMMON+V	O	3.33V
4	COMMON	I	1.66V
5	REC	I	GND: ON OPEN: OFF
6	RET	I	GND: ON OPEN: OFF
7	SW COMMON	O	GND
8	FRAME GND	–	

⑨ **DC IN:** 2P (DC JACK TYPE 4)



– **EXT VIEW** –

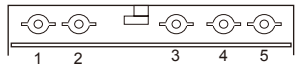
⑩ **HDMI OUT:** (19P)



– **EXT VIEW** –

No.	Signal	I/O
1	TMDS_DATA2+	O
2	TMDS_DATA2_SHIELD	–
3	TMDS_DATA2–	O
4	TMDS_DATA1+	O
5	TMDS_DATA1_SHIELD	–
6	TMDS_DATA1–	O
7	TMDS_DATA0+	O
8	TMDS_DATA0_SHIELD	–
9	TMDS_DATA0–	O
10	TMDS_CLOCK+	O
11	TMDS_CLOCK_SHIELD	–
12	TMDS_CLOCK–	O
13	CEC (N.C.)	–
14	RESERVED (N.C.)	–
15	SCL	O
16	SDA	I/O
17	DDC/CEC_GND	–
18	+5V_POWER	O
19	HPD	I

⑪ **Battery:** (5P)



– **EXT VIEW** –

No.	Signal	I/O	Specifications
1	BATT (+)	–	+11 to +17 V dc
2	BAT_SCL	O	
3	BAT_SDA	I/O	
4	BATT_ID_DATA	I	
5	BATT (–)	–	

1-2. Location of the Printed Wiring Boards

① ASW-68 board
② AU-326 board
③ AXM-42 board
④ BI-202 board
⑤ BI-203 board

⑥ BI-204 board
⑦ CN-3258 board
⑧ CN-3259 board
⑨ CN-3273 board
⑩ DAP-41 board

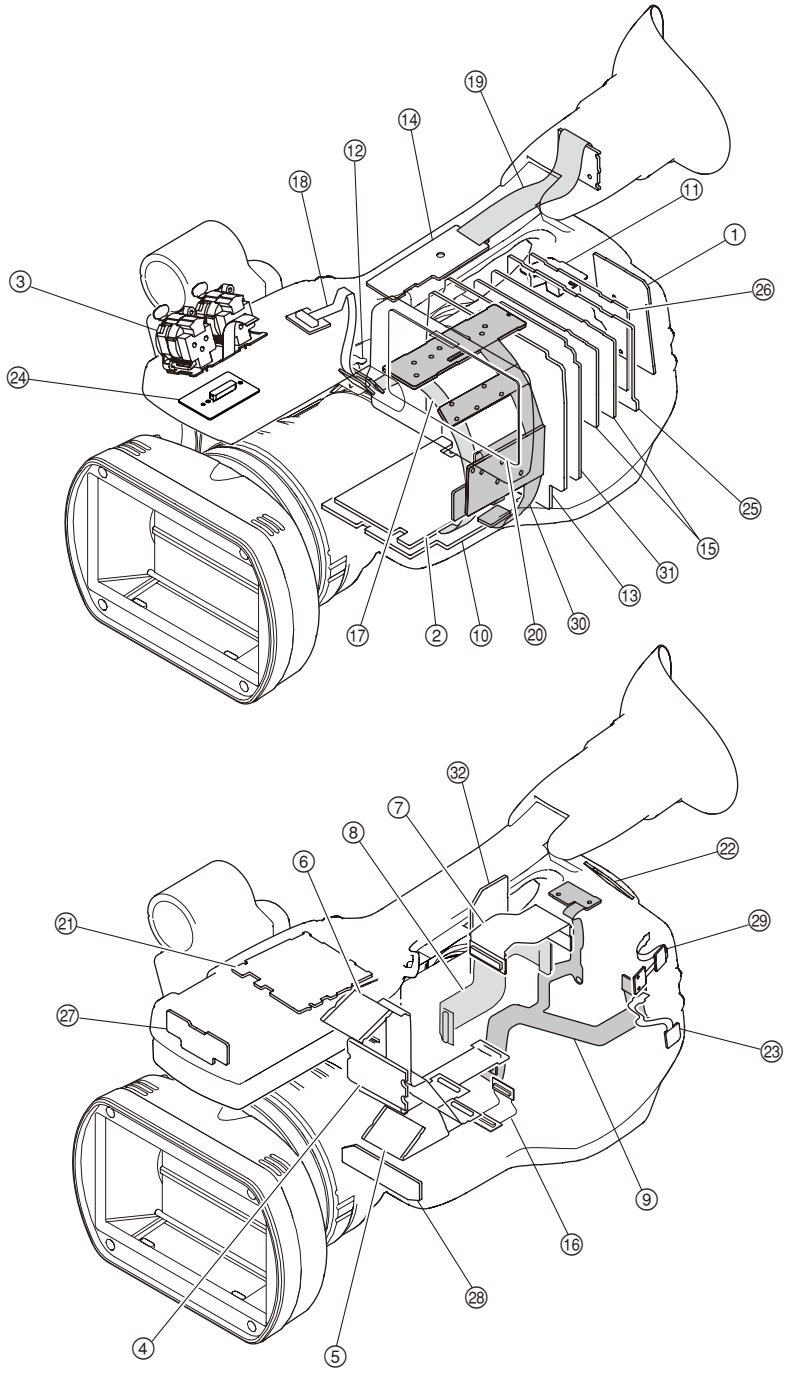
⑪ DC-152 board
⑫ DET-52 board
⑬ DPR-311 board
⑭ DR-644 board
⑮ EC-68 board

⑯ HN-356 board
⑰ HN-360 board
⑱ HN-361 board
⑲ HN-363 board
⑳ IF-1127 board

㉑ KSW-55 board
㉒ LED-491 board
㉓ LED-494 board
㉔ MA-183 board
㉕ RE-272 board

㉖ RE-273 board
㉗ RM-224 board
㉘ SW-1478 board
㉙ SW-1484 board
㉚ SWC-50 board

㉛ TX-131 board
㉜ VIF-46 board



1-3. Circuit Description

1. CMOS Block System

BI-202/203/204 Board

The BI-202, BI-203 and BI-204 boards are the rigid flexible boards connecting the CMOS image sensors (IC1) to the DPR-311 board.

The CMOS image sensor receives the three primary colors of R, G and B that are separated from the incoming light by the prism. The CMOS image sensor converts the incoming primary color to electric signal. The built-in 12-bit column A/D converters then convert the R, G and B analog video signals to the digital video signals respectively.
The electronic shutter, analog gain amplifier and black level clamp functions are also provided in the above boards.

The BI-202 board is for the R-channel signal, the BI-203 board is for the G-channel signal and the BI-204 board is for the B-channel signal.
The CMOS image sensor receives the sync signal and the serial communication signal from the DPR-311 board. The 12-bit digital video signals that are supplied from the CMOS image sensors pass through the EMI filters (FL1 to FL4) and are input to the DPR-311 board.
Various decoupling capacitors and the damping resistors are also mounted in the above boards.
IC3 of the BI-203 board is a temperature sensor that sends the temperature data to the CAMERA MICON (camera µ-processor: IC500) on the DPR-311 board via I^2C bus.

2. Camera Block System

DPR-311 Board

The DPR-311 board consists of the Camera Signal Processor IC (IC200) and the CAMERA MICON (camera µ-processor: IC500) whereas the Camera Signal Processor IC (IC200) performs various processing on the digital video signal supplied from the CMOS image sensor, and the CAMERA MICON (IC500) performs control of IC200 and other various controls such as control of the CMOS image sensor and of lens. And the output digital video (Y/C) signal is sent to the next circuit the video (baseband video) signal processing circuit.
The 12-bit digital video (RGB) signals supplied from the CMOS block (BI-202, BI-203 and BI-204 boards) first enter the camera signal processor IC (IC200). In the camera signal processor IC (IC200), average value, peak value of the RGB digital video signals that are required for the following AUTO operations of the camera are detected.
The detected signals are sent to the CAMERA MICON (camera µ-processor: IC500).

- Auto white balance
- Auto black balance
- Auto focus
- Auto iris
- Auto knee

The digital video signal from the CMOS image sensor enters first the selector circuit selecting either the digital video signal from the CMOS image sensor or the internal TEST signal. The output video signal from the selector enters the compensation circuits consisting of the CMOS imager-related compensation circuit and the lens-related compensation circuit. The video signal then receives the white balance processing, and the matrix signal and the detail signal are added to the video signal. The video signal then receives the pedestal control, knee compensation, gamma correction and white/black clip processing. The video signal finally enters the baseband processing IC (IC600).
The pixel number conversion processing from 1920/1080 to 1440/1080 or 1280/720 is also performed inside IC200.

The CAMERA MICON (camera μ-processor: IC500) performs the overall control over the entire camera system and is controlled by the camera system controller (IC2900).
Peripheral ICs of the CAMERA MICON (camera μ-processor: IC500) are FLAH ROM (IC413) and SDRAM (IC414).

3. Video Signal System

DPR-311 Board

The digital video (Y/C) signal output from the camera signal processor IC (IC200) enters the baseband processing IC (IC600).
The baseband processing IC (IC600) performs the overall baseband processing of video and audio signals with a single chip IC containing the various scaler functions (supporting the multiple format outputs), various OSD functions, PLL function (54 MHz → 74 MHz) and CPU.
The baseband processing IC (IC600) provides the following outputs:
- HD/SD Component (digital): To TX-131 board
- HD/SD Component (analog): To TX-131 board
- Composite (analog): To TX-131 board
- LCD signal (digital): To LCD module
- EVF signal (analog): To DR-644 board

The input/output signals of the baseband processing IC (IC600) are the following signals:
- MPEG encoder/decoder I/F signal (digital): To IC1500
- Audio I/F signal (digital): To IC1300

Peripheral circuits of the baseband processing IC (IC600) are the master clock 54 MHz VCXO (X800) control circuit (IC803, IC804, IC806, IC807, IC808) and the Mobile DDR SDRAM memory (IC1100, IC1101).
Peripheral circuits of the built-in CPU are FLASH ROM (IC1003) and SDRAM (IC1000).
The baseband processing IC (IC600) is controlled by the system controller (IC2900). The LCD driver IC, the EVF driver IC, SDI Co-pro, the audio system and the power save control of the output systems are controlled by the built-in CPU inside IC600.

4. Media Recording and Playback

DPR-311 Board

Output from the baseband processing IC (IC600) is input into the MPEG encoder/decoder (IC1500).
The MPEG encoder/decoder (IC1500) is the single-chip MPEG Codec IC that encodes and decodes both the high-quality HD video signal and audio signal in real-time. It has various interfaces with signals such as MPEG video, video input/output, MPEG audio, audio input/output, bit stream input/output, and interface with the host.
IC1500 output is then input into LSI (IC1600) for AVIT signal processing.
LSI (IC1600) for AVIT signal processing contains the built-in CPU and has interfaces for DDR2 SDRAM memory (IC1800, IC1801), PCI bus, PCI-Express bus, I/O for IC1500, and serial communication with system controller (IC2900).
IC1600 is also connected to the NOR-type Flash ROM (IC1901) to read the CPU program in the IC1600 during initial startup.
LSI (IC1600) for AVIT signal processing is controlled by the system controller (IC2900), in the same way as other main devices, and provides the following types of functions: video/audio stream control, access to the SxS memory card, mass storage operations when connected to USB and HDV device controls when connected to i-LINK.

Explanation of peripheral devices

<SxS memory card slot>

Two memory card slot boards (EC-68) are connected to the dual channel PCI-Express signals coming from IC1600 through a 0.4 mm pitch, 30-pin fine coaxial cables connected to CN2400 and CN2401.
Furthermore, dual channel USB host signals output from USB host controller (IC2300) are connect to the EC-68 board through fine coaxial cables just as with the PCI-Express signals.
IC2300 is controlled by PCI bus from IC1600.

<USB device controller>

USB device signal output from USB device controller (IC2000) is connected to output board (DAP-41) through the both-sided flexible board (HN-356) from CN3302 connector, and then it is connected to USB Mini-B connector (CN106) on the DAP-41 board.
IC2000 is controlled by the dedicated bus from IC1600.
If there is no USB connection, the power supply for IC2000 drops off.

<i-Link controller>

The i-Link signal output from the i-Link controller (IC2200) is connected to the 4-pin i-Link connector (CN3) on the CN-3273 board passing through the both-sided flexible board (CN-3273) from the CN3400 connector.
IC2200 is controlled by the PCI bus from IC1600.

5. Audio system

This overview explains the audio system according to the audio block diagram shown in Fig. 1.

MA-183 Board

The MA-183 board contains a built-in microphone unit. The MA-183 board amplifies the audio signal with the microphone bias power supply and head amplifier (Q5, Q7, and Q9, and Q6, Q8, and Q10). It provides the balanced output for the audio signal.

AXM-42 Board

The AXM-42 board is a connector board on which XLR (3-pin) connector for external LINE/MIC input and the [LINE/MIC/MIC +48V] input selection switch for two channels are mounted on this connector board.

KSW-55 Board

This board performs the read and tally controls for the switch on the handle. The audio signal block relays the audio signal between the MA-183 board and AXM-42 board.

HN-360/HN-361 Flexible board

This board relays the audio signal between the KSW-55 board and the AU-326 board.

AU-326 Board (Audio block)

This board controls the analog audio input signal processing, as well as microphone +48 V power supply and serial signal.

- Audio signal from the built-in microphone on the MA-183 board is input to the balanced input amplifier IC200 and IC201 of this board. Output of the balanced amplifier is connected to the analog switch (IC208, IC209) for switching between [INT/EXT].
- The DC-DC converter (IC100, Q100) for microphone power +48 V is built-in, and when EXT MIC +48 V is going to be supplied, the EXT MIC +48 V is supplied by the switch (Q200, Q201, Q202 and Q203).
- The audio input signals from MIC and LINE are input to a common circuit that receives both of the MIC input level (−20 dBu to −65 dBu) and the LINE input level (+4 dBu). The input attenuator is inserted in the circuit switch (Q212, Q213, Q214, Q215 and Q216 to Q219) as required. This audio input signal is received by the balanced input amplifier (IC202, IC203) that performs amplification of 0/+12 dB and switching (Q224, Q225, Q226, Q227) in accordance with the level that is set by INPUT TRIM. After that, the audio signal is connected to the [INT/EXT] switch (IC208, IC209).
- The [INT/EXT] switch (IC208, IC209) performs not only the INT/EXT switching but also performs the input channel mode selection [CH1/ (CH1/CH2)].
- SEL (IC204, IC205)/AMP (IC206, IC207) are a signal selector and buffer amplifier to perform AGC link.

DAP-41 Board (Audio block)

The DAP-41 board is comprised of two pieces of the Audio Codec IC and the IC202, IC203.
(RTC is also built on this board, but the explanation has been omitted here.)

- Audio Codec (IC202, IC203)
  The analog audio signal from the AU-326 board is connected to IC202 and IC203 that are the Audio Codec (PGA, ADC, DSP, Digital IF, headphones amplifier, speaker amplifier are built on one chip and the parameters are set with I²C).
  The analog signal after level adjustment by the Input TRIM (PGA) is converted to the digital signal with the ADC.
  The digital signal receives the [Wind Filter] (on/off) processing of the Audio Level control, AGC Limiter and Internal mic from the DSP. After the audio signal receives these processing, the digital signal is output for audio recording.
  Playback output (including EE) is the digital signal that is connected to Audio Codec where it is converted to the analog signal with DAC and output to the ASW-68 board.
  Furthermore, the audio signal that is processed for audio monitoring in the ASW-68 board is connected to the headphones amplifier and speaker amplifier through the monitor level control from the IN2LP input and IN2RP input of IC202.
  From the DPR-311 board, BEEP (IC600) is level-controlled internally by IN2LN (IC202), and output to the speaker HP.
- FPGA (IC1300) on the DPR-311 Board
  The digital signal output signal is supplied to the Display Block (Base band) from the Audio Codec. FPGA (IC1300) also receives the playback output signal from the Display Block.
  The playback system selects CH1/CH2 or CH3/CH4, connects EE, and connects TEST TONE from the Display Block depending on the data.
  Furthermore, FPGA divides the clock signal that is supplied from the Display Block to Audio Codec on the DAP-41 board.

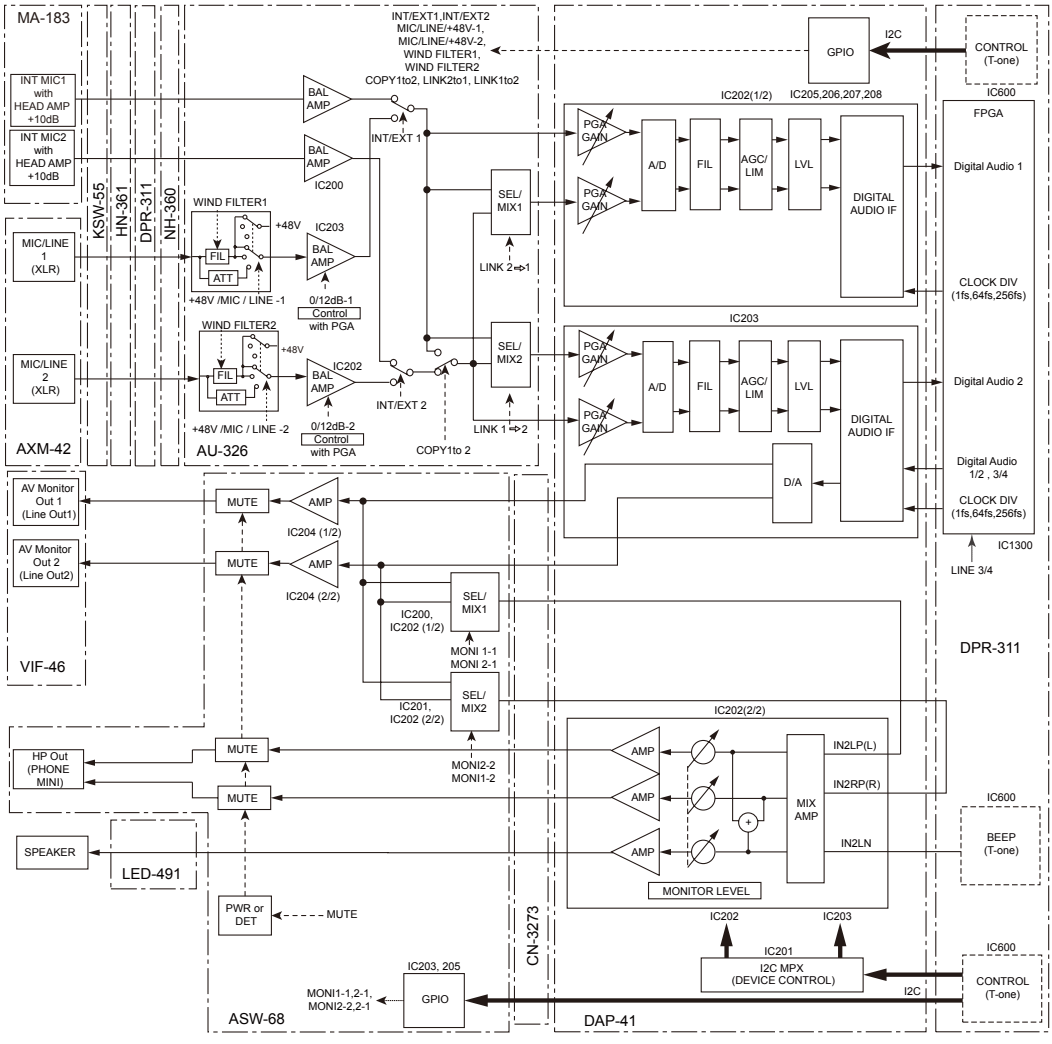


Fig. 1. Audio block diagram

- Serial control
  The I²C control signal from Display Block (Base band) is converted into GPI, and performs switching such as [INT/EXT], [LINE/MIC/MIC+48], [CH1/ (CH/CH)], and AGC [Linked/Separated] for CH1 and CH2.
  The I²C control from Display Block (Base band) selects either IC202 or IC203 for the target with I²C MPX (IC201) and sets the register of IC202 or IC203.

CN-3273 Flexible board

It relays the audio signal from the DPR-311 board to the ASW-68 board.

ASW-68 Board (Audio block)

- Analog output from the DAP-41 board Audio Codec is buffered by IC204 and is output to the A/V connector after passing through the audio MUTE control.
- Analog output from Audio Codec on the DAP-41 board re-enters into the IN2LP input and IN2RP input of the DAP-41 board Audio Codec after passing through the monitor selector/mixer (IC200, IC201, IC202), and becomes the monitor signal.
- Serial control
  I²C control signal from Display Block (Base band) is output at GPI, and performs the switching between MONITOR [CH1/CH2] / [CH1+CH2] / [CH1] / [CH2] for CH1 and CH2 respectively.

VIF-46 Board (Audio block)

The audio output from the ASW-68 board is connected to A/V multi-connector and connector board.

LED-491 Board (Audio block)

The headphones output signal is connected to the headphones jack (CN3) of the LED-491 board, and the speaker output signal is connected to the speaker connector (CN2).
The headphones output is muted by the MUTE (Q2, Q3).

Switch/Volume control (Audio controller block)

Operation panel functions relating to audio signal are built into the following blocks.

ASW-68 Board (Audio block)

For CH1 and CH2, the switches [INT/EXT] and [AUTO/MANUAL] are connected to PIO of CPU (IC301), and the volume control [AUDIO LEVEL] is connected to ADC of CPU (IC301).

KSW-55 Board (Audio block)

The switch [LINE/MIC/MIC+48] on the AXM-42 board is connected to PIO of CPU (IC100) for CH1 and CH2 respectively. The switch [MONITOR (AUDIO) +/−] that is common to CH1 and CH2 is connected to PIO of CPU (IC100).

6. System Control

DPR-311 Board

The 32-bit RISC CPU (ARM) with ARM core is built-in as the system controller (IC2900).
It has the peripheral interface functions of SDRAM, USB, SCI, and I²C. It operates on a 27 MHz clock (X2900). FLASH ROM (IC2908), SDRAM (IC2909), and EEPROM (IC3205) are mounted as the peripheral ICs.
It performs the system control through serial communication with IC500 of the camera block system, IC600 of the video signal system, and IC1600 of the media recording/playback system.

Main functions of the system controller and peripherals

(1) Reading operation switch information

Reading the switch information and the LED control are performed by I²C bus communication with each sub-microprocessor.

- Handle switch: IC100 on the KSW-55 board
- Inside panel switch: IC200 on the SWC-50 board
- Rear panel switch: IC301 on the ASW-68 board
- Power supply switch: IC1001 on the RE-273 board

(2) Watch IC (RTC) control

The watch IC (IC100) is built onto the DAP-41 board.

The watch IC (IC100) is backed up by a lithium coin battery, and the current time is read or set via IC200 on the SWC-50 board.

(3) Infrared remote control demodulation

The RM-224 board has an IC (IC1) for infrared remote control signal demodulation, and it receives the command codes via IC100 on the KSW-55 board.

(4) Info-Battery communication

The Info-Battery of SM bus specifications is supported.

The serial terminal of the battery connector is connected to IC1001 on the RE-273 board. This IC1001 read the battery authentication, battery type, remaining power, and other information and send them to the system controller via I²C bus communication.

(5) Power supply voltage detection

The power supply voltage at the DC IN connector is measured by the A/D port on IC1001 on the RE-273 board, and it is posted to the system controller as the input voltage value.

(6) Power system control

IC1001 on the RE-273 board checks that the power switch on the PMW-EX1R is turned ON, and turns on the system controller of IC2900. After that, it controls the power for each circuit block according to the system controller.

The system controller controls the respective power supply systems in the RE-272 and RE-273 boards according to the operation mode of the device, via the power supply μ-processor (IC1001) on the RE-273 board.

By turning off the power systems to unnecessary circuits blocks, power can be saved.

7. EVF/SDI System

SDI block

TX-131 Board

This board receives the parallel video signal with FPGA (IC200) and outputs the SDI signal.

Furthermore, it performs audio or timecode embedding.

The video and audio signals are supplied from CN700 on the DPR-311 board to CN100 on the TX-131 board with B to B connector.

Output SDI signals are supplied to CN500 through the cable driver (IC500).

Output SDI signals are then supplied from CN500 to the coaxial connector via the mini coaxial connector and mini coaxial cable.

The PLL circuit is used to reduce jitter of the HD-SDI clock signal.

The FPGA (IC200) is controlled by IC600 on the DPR-311 board through 4-line serial communication.

8. Power supply system

RE-272/273 Board

This board is comprised of the power supply circuit and the POWER SUPPLY MICON (power supply μ-processor: IC1001 on the RE-273 board).
However, part of the low-voltage power supply is mounted on the DPR-311 board.

(1) Input power supply (UNREG) system operations

When the UNREG power is input, the EVER power state is established.
In this state, the ON/OFF state of the Power switch can be recognized.
If the POWER SUPPLY MICON (power supply μ-processor: IC1001) recognizes that Power switch is ON, the power is turned on for the system control system and the POWER SUPPLY MICON (power supply μ-processor: IC1001) controls the power supply for each block according to the system controller (DPR-311 board: IC2900).
The normal value for the input power supply (UNREG) is in the range of about +10.5 V to +18 V.

- Battery/EXT-DC select
  Input power comes in two systems: Battery and EXT-DC. This switch monitors the input voltage for each input and automatically switches the circuit settings with priority given to EXT-DC.

- Input overvoltage protection
  If the voltage is too high in the UNREG power supply, the overvoltage protection circuit starts operating around the set value of +17.9 V, and the camera shuts down. When the input power supply voltage to this circuit becomes less than +17.9 V, the power supply immediately switches on with automatic recovery.

- Input low-voltage protection
  If the voltage is too low in the UNREG power supply, the low-voltage protection circuit starts operating around the set value of +10.5 V according to the control by the POWER SUPPLY MICON (power supply μ-processor: IC1001), and the camera shuts down. When the input power supply voltage becomes higher than +10.5 V, the power supply immediately switches on with automatic recovery according to the control by the POWER SUPPLY MICON (power supply μ-processor: IC1001)

- Overcurrent detection
  The overcurrent detection circuit is comprised of IC308 on the RE-272 board. The setting value is approximately 4.3 (A). Even after clearing IC308 after overcurrent detection, automatic recovery is not performed and the power must be turned on again.

- Power supply reverse connection protection
  If the input power has reverse voltage, Q301 on the RE-272 board is immediately turned off and UNREG power is stopped on the GND side, and the protection function works.

- Power saving function during standby
  When the power switch of the camera is turned off, the POWER SUPPLY MICON (power supply μ-processor: IC1001) enters the Sleep mode in order to save the power by minimizing the detection circuit of the camera power switch.

(2) DC/DC converter function

The power supply output is divided into 25 systems, which are separated into four blocks as seen below.

- CMOS/camera block system, 7 systems
  (+4.6 V, +3.1 V, UNREG, etc.)
- Audio/video signal system, 7 systems
  (+13.5 V, −4.6 V, +4.6 V, etc.)
- System controller system, 5 systems
  (+4.6 V, +3.1 V, +2.5 V, etc.)
- Media recording/playback system, 6 systems
  (+3.1 V, +2.5 V, +1.8 V, etc.)

The sequence control (powering up and powering down) for the power supply system is controlled by the POWER SUPPLY MICON (power supply μ-processor: IC1001) for the respective power supply blocks of each block.

By turning off the power for each block according to the operation mode (camera mode or media mode), the optimal power consumption for each operation is achieved.

- Short-circuit protection for each power supply system
  The circuit settings monitor each output voltage or current for each power supply system and operate the protection circuits per block.
  Even after the protection circuit is cleared, automatic recovery is not performed and the power must be turned on again.
  Even after short-circuit is cleared, the protection circuit does not recover automatically and the power must be turned on again.

(3) Battery information functions

- Battery authentication function
  The authentication function checks whether the battery is of the specified type. This helps prevent one cause of major accidents when using batteries as a power supply. If the attached batter is not the specified type of batter, the camera immediately turns off.

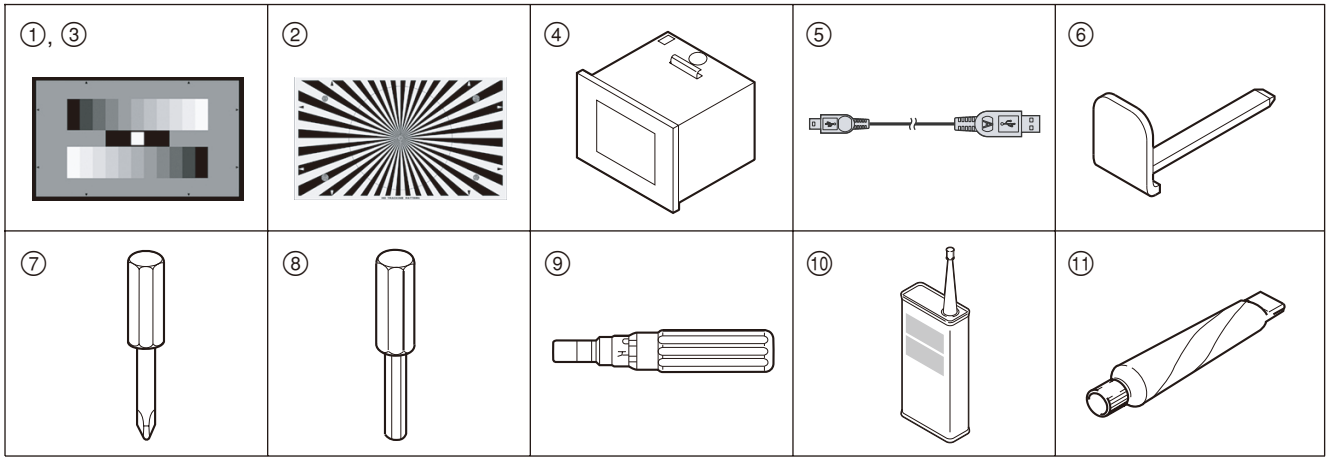
- Battery Info function
  In an intelligent (specified) battery, the battery can monitor information, such as how many times the battery has been recycled or the internal temperature for the battery. This helps provide detailed information about the battery, including whether the battery is damaged or how long the life is, in order to provide optimal operations.

1-4. Service Tools/Measuring Equipment List

1-4-1. Service Tools

Figure No.	Part No.	Name	Usage/Note
①	Commercially available	Grayscale chart	Reflective type (16 : 9), Camera adjustment on market
②	Commercially available	Star chart	Reflective type, camera adjustment on market
③	J-6394-080-A	Grayscale chart	Transparent type (16 : 9), Camera adjustment on market
④	J-6029-140-B	Pattern box PTB-500	Camera adjustment
⑤	∗	Mini USB cable	For firmware version-upgrade
⑥	3-292-755-01	XLR tool	For removing the mounted circuit board
⑦	J-6325-110-A	Bit for torque driver (M1.4/M1.7)	For tightening screw
	J-6325-380-A	Bit for torque driver (M2)	
⑧	J-6326-120-A	Hexagon bit (For torque screwdriver) (size 1.5)	For tightening screw
⑨	J-6325-400-A	Torque driver (3 kg•cm) (0.3 N•m)	For tightening screw
	J-6252-510-A	Torque driver (6 kg•cm) (0.6 N•m)	
⑩	7-432-114-11	Locking compound 200 g	For preventing screw from being loosened
⑪	7-651-000-10	Sony (SGL-601) 50 g grease	Lubricant

∗ : This cable is supplied with PMW-EX1R.



1-4-2. Measuring Equipment

Use the calibrated equipment or equivalent as listed below for the adjustments.

Equipment	Model name
Oscilloscope	Tektronix TDS3054 or equivalent (150 MHz or more)
HD waveform monitor	LEADER ELECTRONICS CORP.LV5152DA or equivalent
Frequency counter	Advantest TR5821AK or equivalent
Digital voltmeter	Advantest TR6845 or equivalent
Color monitor	Sony HDM-20E1U/14E1U/14E5U or equivalent
Luminance meter	Konica Minolta LS-110 or equivalent

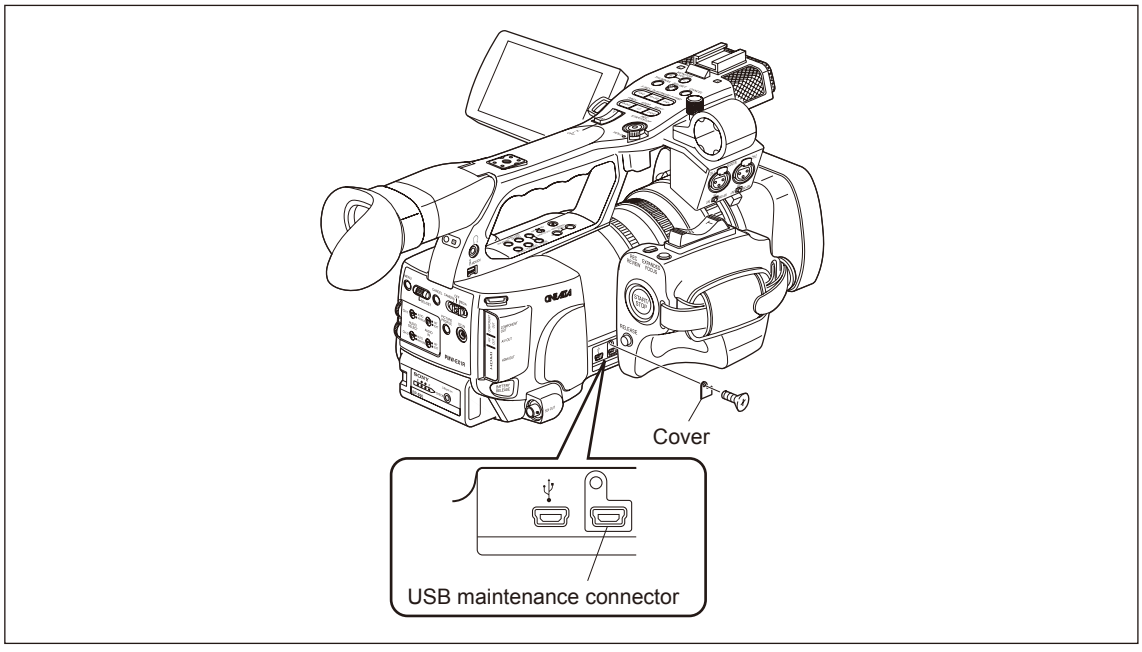
1-5. Firmware Upgrade

Upgrade the firmware for the PMW-EX1R through a USB connection to a computer.
For detailed information about the upgrade procedure, check the readme file that comes with the upgrade software.
For inquiry or comments about the firmware upgrade, please contact the Sony sales office.

Firmware Upgrade Procedure

Download the software for the new firmware upgrade onto the computer before starting these operations.

1. Check that the power switch on the PMW-EX1R is turned OFF.
2. Remove the cover on the USB maintenance connector.

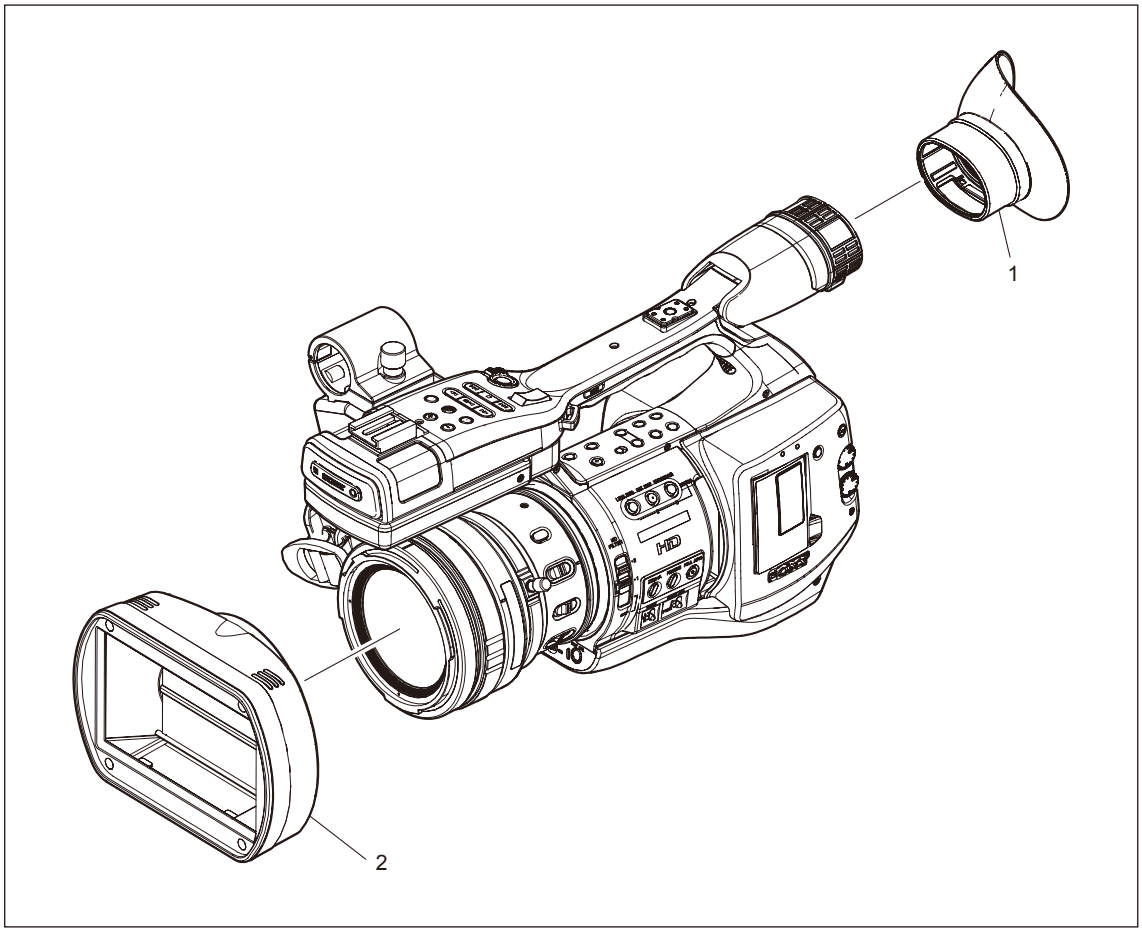


3. Use the USB connector that comes with the PMW-EX1R to connect the computer and the USB maintenance connector.
4. Switch the power switch to CAMERA and turn the power ON.
5. Run the software for the firmware upgrade on the computer.
6. When the upgrade is complete, turn OFF the power and remove the USB cable.
7. Attach the cover on the USB maintenance connector.

When the PMW-EX1R is connected to the computer for the first time, the driver software will need to be installed into the computer. For more details, check the readme file that comes with the upgrade software.

1-6. Recommended Replacement Parts

This section describes the recommended replacement parts and recommended replacement time.



ID	Part name	Sony part No.	Recommended replacement timing
1	Eye cup	4-164-856-01	Check for deformation and deterioration from time to time. Replace it as necessary.
2	Lens hood	4-179-065-01	

1-7. Circuit Protection Part List

1-7-1. Circuit Protection Element

This unit is equipped with the positive characteristics thermister (s) (power thermister) as the circuit protection element. The positive characteristics thermister limits the electric current flowing through the circuit as the internal resistance increases when an excessive current flows or when the ambient temperature increases.
If the positive characteristics thermister works, turn off the main power of the unit and inspect the internal circuit of this unit. After the cause of the fault is eliminated and the positive characteristics thermister is cooled down, turn on the main power again. The unit works normally.
It takes about one minute to cool down the positive characteristics thermister after the main power is turned off.

Board	Ref. No. (Address)	Part No.	Hold Current
CN-3273	THP1 (A-1/Side A)	⚠ 1-805-726-11	0.20 A/25°C
	THP2 (A-1/Side A)		
	THP3 (A-1/Side A)		
	THP4 (A-1/Side A)		

1-7-2. Replacing Fuse

WARNING

The fuse is an essential part for safe operation.
Replace the components with Sony parts whose part numbers appear in the manual published by Sony. If the components are replaced with any parts other than the specified ones, this may cause a fire or electric shock.

CAUTION

If the fuse is replaced while the main power is kept on, this may cause electric shock.
Before replacing the fuse, not only turn off the POWER switch but also disconnect the cable that is connected to the DC IN connector.

This unit is equipped with fuses.
The fuses blow if an excessive current flows due to abnormality inside the equipment. If fuses blow, turn off the main power of the equipment once, and inspect inside of the equipment and remove the cause of excessive current. After that, replace the fuses.

Board	Ref. No. (Address)	Part No./Name
RE-272	F1 (B-1/Side B)	⚠ 1-533-627-21 Fuse 5 A, 125 V
	F2 (A-2/Side B)	

1-8. Note on Service

1-8-1. Requirements on Replacement of Boards or Parts

This section explains the necessary setups required when replacing boards or parts.

1. When any of the following boards is replaced, upgrade the firmware version.
   All data are written at once when upgrading the firmware version. (Refer to Section 1-5.)
   Board name : • DPR-311
   • KSW-55
   • SWC-50
   • ASW-68
   • RE-273
   • TX-131

2. Adjusted values are stored in the following boards and parts. The values need to be readjusted when they are replaced.
   For readjustment, the dedicated service software "ServiceNavi-EX" is required.
   (Refer to Section 4-1.)
   Board name : • DPR-311*1
   • IF-1127*2
   Part name : • CMOS block
   • EVF block
   • LCD module*2

   *1: The adjusted values for the CMOS block, the EVF block, and the LCD module are stored in the DPR-311 board.
   *2: The adjusted values for the LCD module are stored in the LCD module (IF-1127 board), but the adjusted values need to be copied to the DPR-311 board.

3. The user setting values are stored in IC3250 on the DPR-311 board. The user data must be stored (Restore) in SxS before replacing the board and it must be read (Recall) after replacing the board.

1-8-2. Requirements on Replacement of Lens

When the lens is replaced, perform the flange-back adjustment.

1-8-3. Note on Replacement of Parts on the Board

1. The BI-202, BI-203 and BI-204 boards cannot be replaced on the board-level service or part-level service. If parts become defective, replace the entire CMOS block.
2. Parts labels also cannot be replaced in the respective boards. If parts become defective, replace the entire mounted board.

1-8-4. Description of Number Seal on the Prism

The number seal is put in the prism unit, the serial number of prism unit.
Every prism unit has its own number called prism serial number.

1-8-5. Memory Backup Battery

For replacing the battery, refer to “Backup Battery” of the “Appendixes” in the Operating Instructions. When the backup battery is replaced, the date and time in the internal clock need to be set. Refer to “Setting the Clock” of the “Preparations” in the Operating Instructions.

1-8-6. Unleaded Solder

Boards requiring use of unleaded solder are printed with a lead free mark (LF) indicating the solder contains no lead.
(Caution: Some printed circuit boards may not come printed with the lead free mark due to their particular size.)

: LEAD FREE MARK

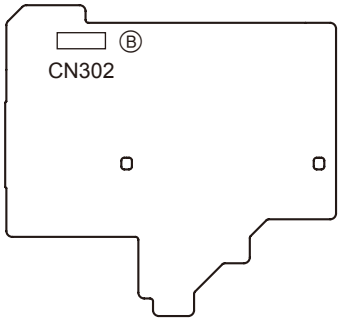
Notes

- Be sure to use the unleaded solder for the printed circuit board printed with the lead free mark.
- The unleaded solder melts at a temperature about 40 °C higher than the ordinary solder, therefore, it is recommended to use the soldering iron having a temperature regulator.
- The ordinary soldering iron can be used but the iron tip has to be applied to the solder joint for a slightly longer time. The printed pattern (copper foil) may peel away if the heated tip is applied for too long, so be careful.

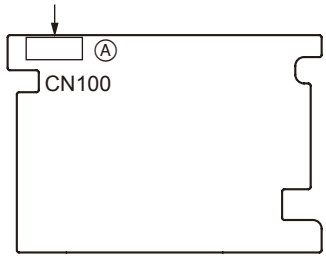
1-9. Connector Location Diagram on Board

The PWM-EX1R uses flexible card wires and coaxial cables with connector. The following diagrams indicate the location of each connector. The location of flexible card cables are indicated by the circle number Ⓐ and Ⓑ, and the location of coaxial cables with connector are indicated by the circle number Ⓒ and Ⓓ

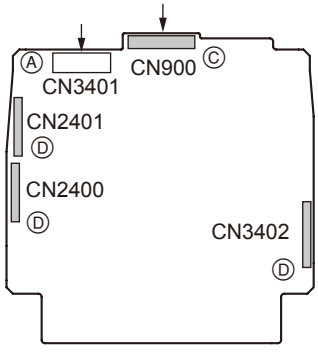
ASW-68 board (B side)



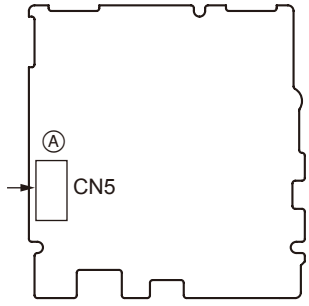
AU-326 board (B side)



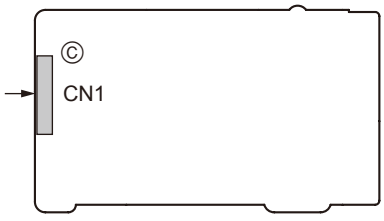
DPR-311 board (A side)



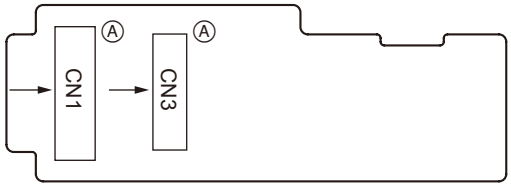
KSW-55 board (A side)



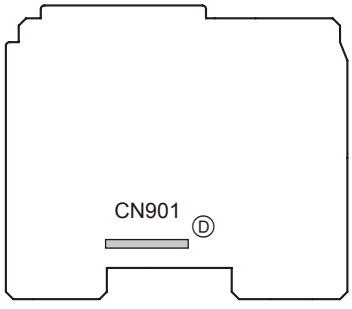
EC-68 board (B side)



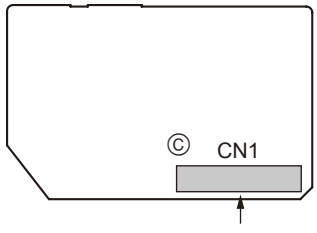
DR-644 board (A side)



TX-131 board (B side)



VIF-46 board (B side)



1-10. Connecting/Disconnecting the Flexible Card Wire

This unit uses the two types connectors for the flexible card wires.

Notes

- Be very careful not to fold the flexible card wire. Life of flexible card wire will be significantly shortened if it is folded.
- The flexible card wire has the conductor side and the insulated area. If the conductor side and the insulated area are connected in the wrong direction, the circuit will not function.
- Insert the flexible card wire straight.
- Ensure that the conduction surface of the flexible card wire is not contaminated.

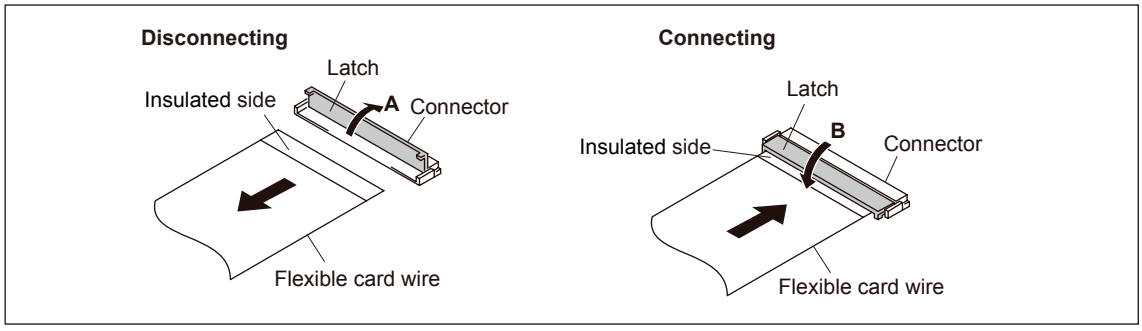
Type A

Disconnecting

Open the latch of the connector in the direction of arrow A to unlock, and disconnect the flexible card wire.

Connecting

1. Insert the flexible card wire firmly as far as it will go, with the insulated side up.
2. Close the latch of the connector in the direction of arrow B to lock.



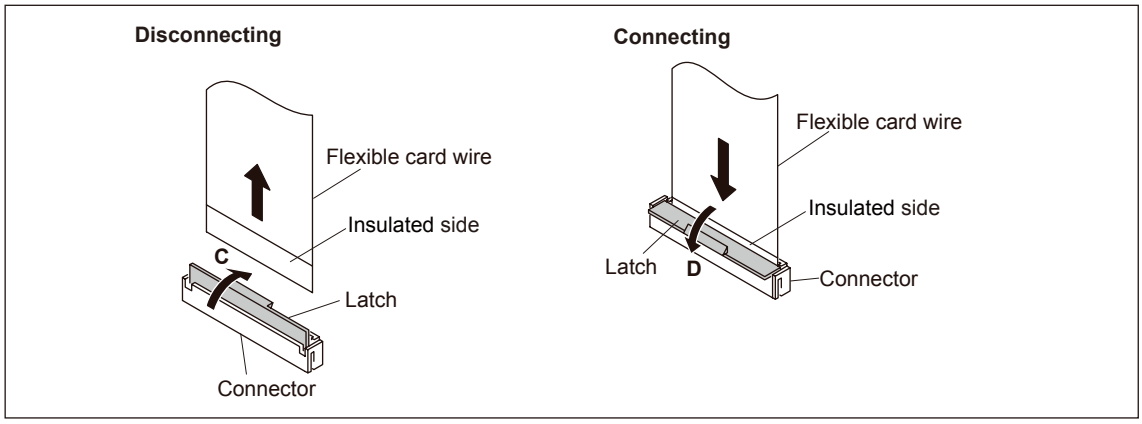
Type B

Disconnecting

Open the latch of the connector in the direction of arrow C to unlock, and disconnect the flexible card wire.

Connecting

1. Insert the flexible card wire firmly as far as it will go, with its insulated side facing front.
2. Close the latch of the connector in the direction of arrow D to lock.



1-11. Replacing the Coaxial Cable with Connector (Fine Pitch Coaxial Cable)

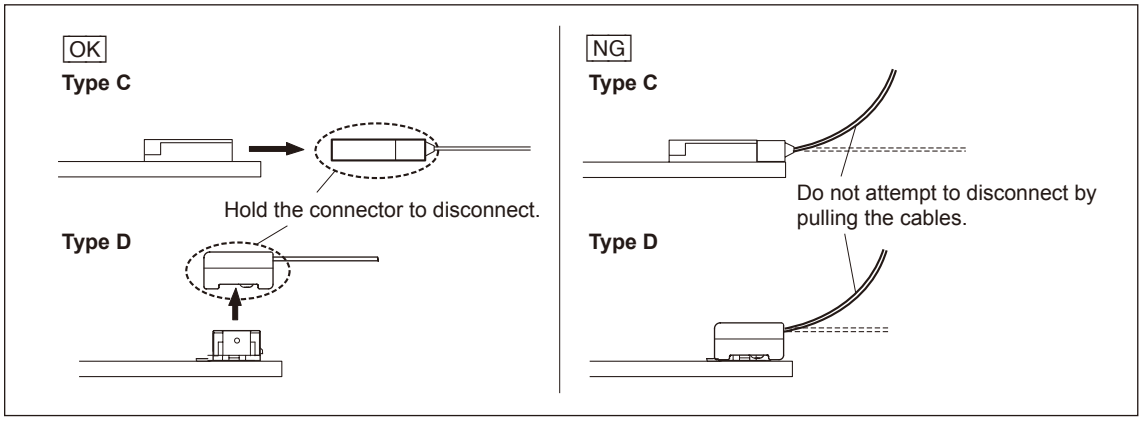
This unit uses coaxial cables with connector.
The following precautions must be observed when removing or connecting the coaxial cable with connector.

Notes

- The coaxial cable with connector uses fine pitch coaxial cables. Be careful when arranging the cable.
- When disconnecting the coaxial cable with connector, do not attempt to remove by pulling the cable. Be sure to hold the connector to remove.
- Do not insert the coaxial cable with connector at an angle.
- Check that the contact on the coaxial cable with connector is free from dirt or dust.
- When connecting the coaxial cable with connector, hold the connector, and align the polarity marks. Then connect the coaxial cable with connector to the connector straight.

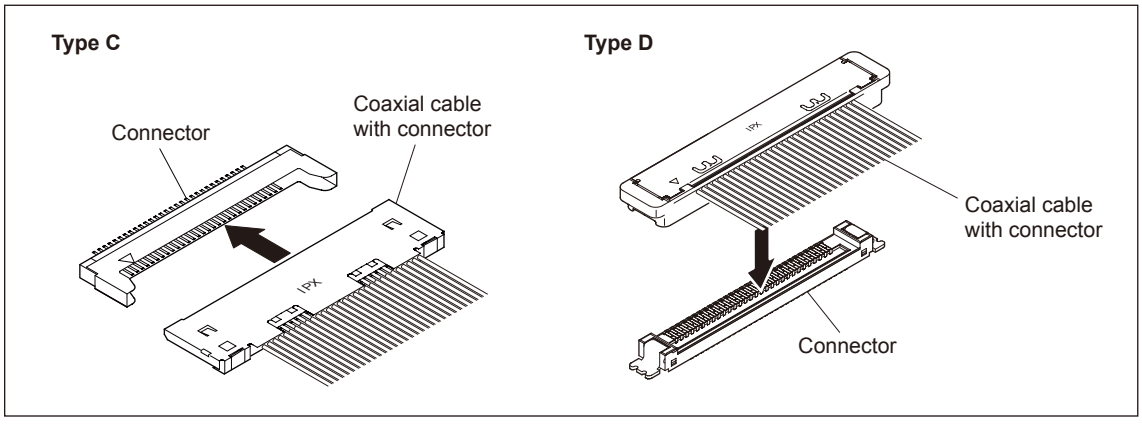
Disconnecting

Disconnect the coaxial cable with connector while holding the connector.



Connecting

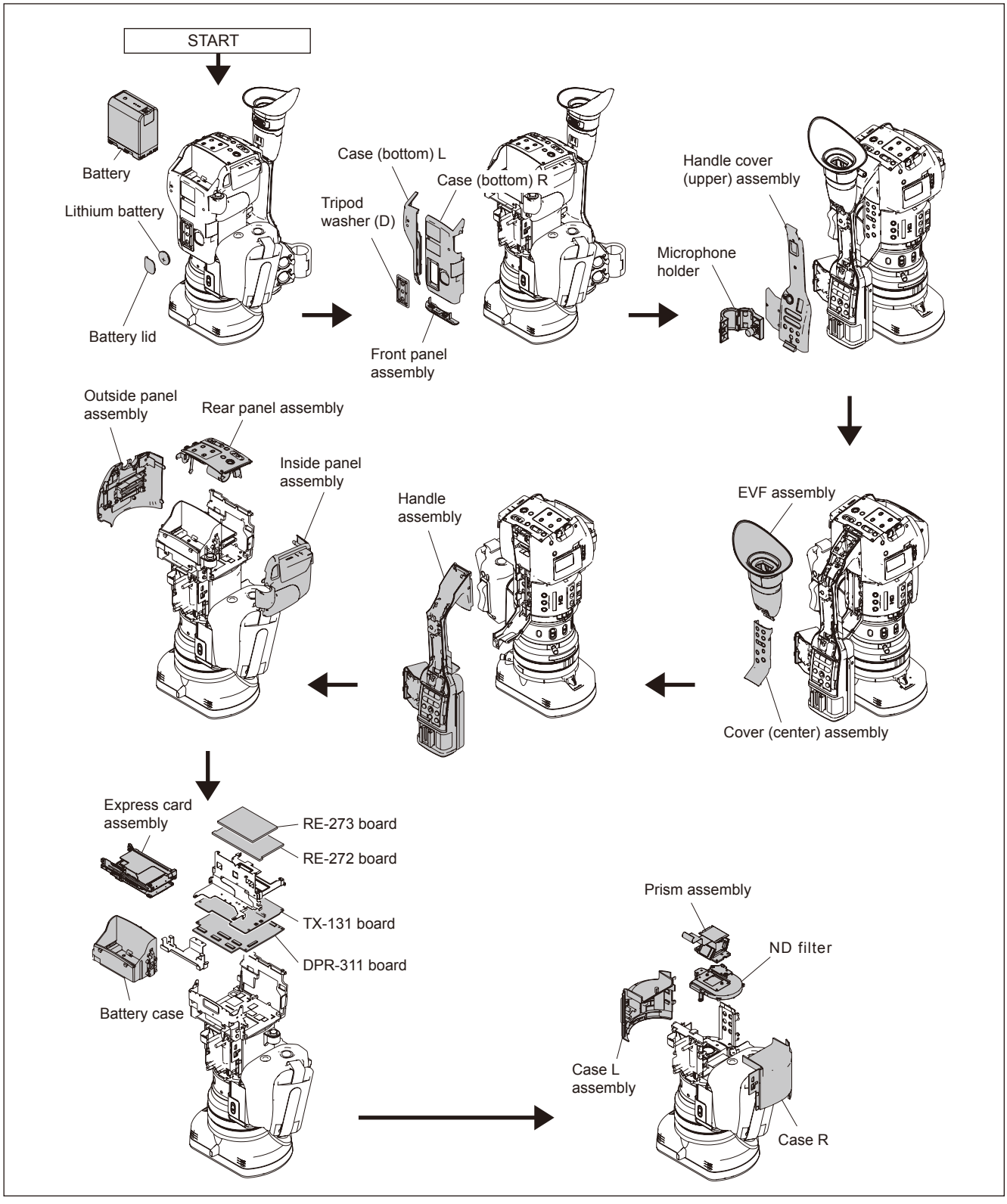
Insert the connector of the coaxial cable with connector firmly as far as it will go.



Section 2
Replacement of Main Parts

2-1. Outline of Replacement Procedures

The following figures show the flow for removing the main parts. Refer to Section 2-2 for details of the replacement procedures.



2-2. Replacement Procedures

Notes

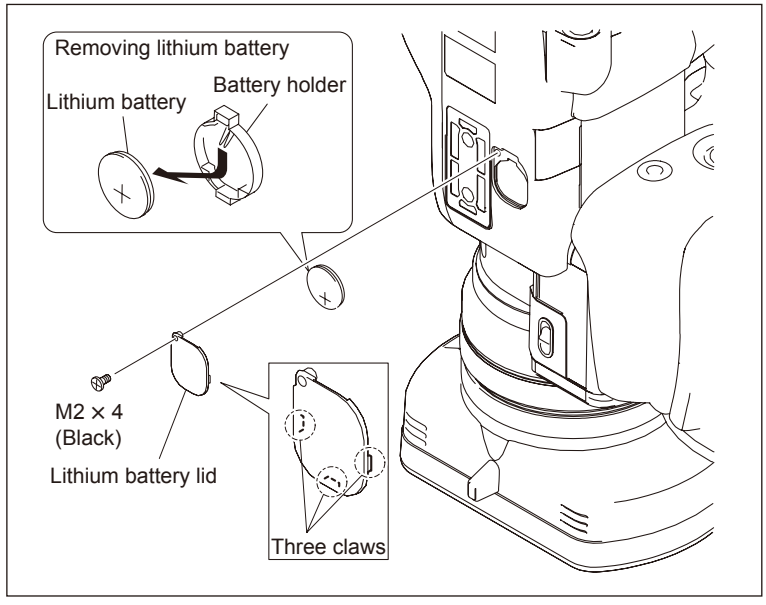
- When tightening screw, be sure to tighten it with the specified tightening torque.
- When reinstalling the removed tapping screw again, tighten it with slightly loose torque not to damage the threads of the component side.
- If the tightening torque is not specified in a specific item, use the tightening torque as specified below.
  M2 (+) screw: 18×10^{-2} ±0.02 N•m (1.8 ±0.2 kgf•cm)
  M2.6 (+) screw: 53×10^{-2} ±0.07 N•m (5.3 ±0.7 kgf•cm)
  M3 (+) screw: 80×10 ±0.01 N•m (8.0 ±0.1 kgf•cm)

- The life of the flexible board and the flexible card wire will be significantly shortened if they are folded. Be very careful not to fold them.
- The coaxial cable with connector uses fine pitch coaxial cables. Be careful when arranging the cable.
- When disconnecting the coaxial cable with connector, do not attempt to remove by pulling the cable. Be sure to hold the connector to remove.

2-2-1. Lithium Battery

1. Remove the screw, and remove the lithium battery lid.
2. Remove the lithium battery.

3. Reinstall the lithium battery by reversing the steps of removal.

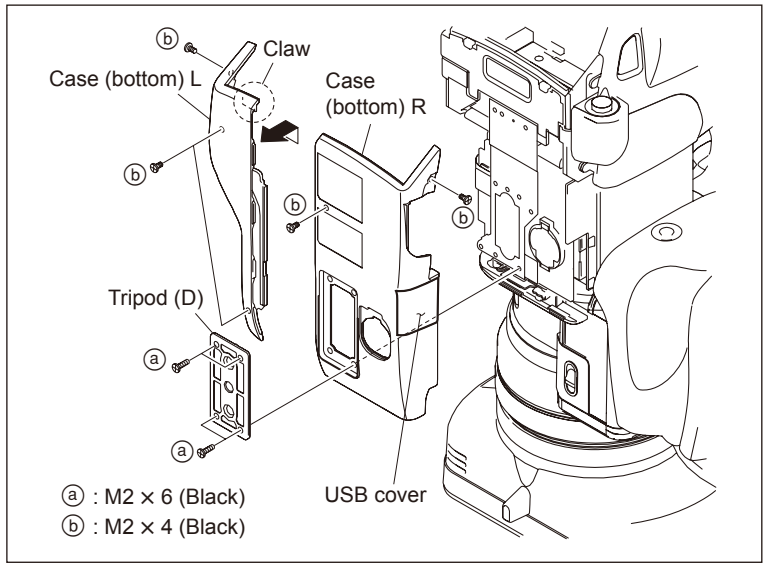


2-2-2. Case (Bottom) L/R and Front Panel Assembly

1. Remove the lithium battery. (Refer to Section 2-2-1.)
2. Remove the four screws of ⓐ, and remove the tripod washer (D).
3. Remove the five screws of ⓑ, and remove the case (bottom) L in the direction of the arrow.
4. Remove the case (bottom) R.

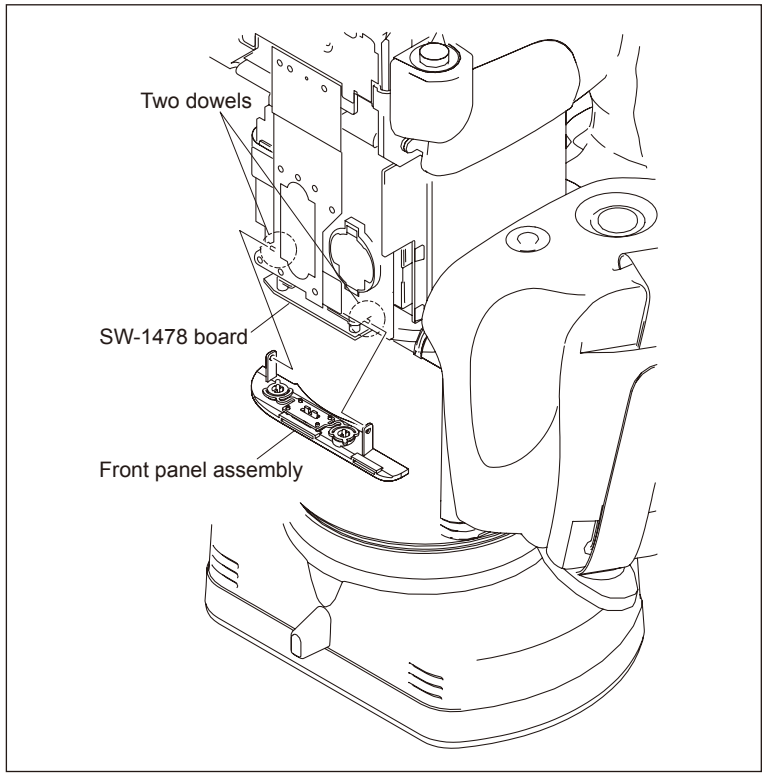
Note

Be careful not to drop or damage the USB cover.



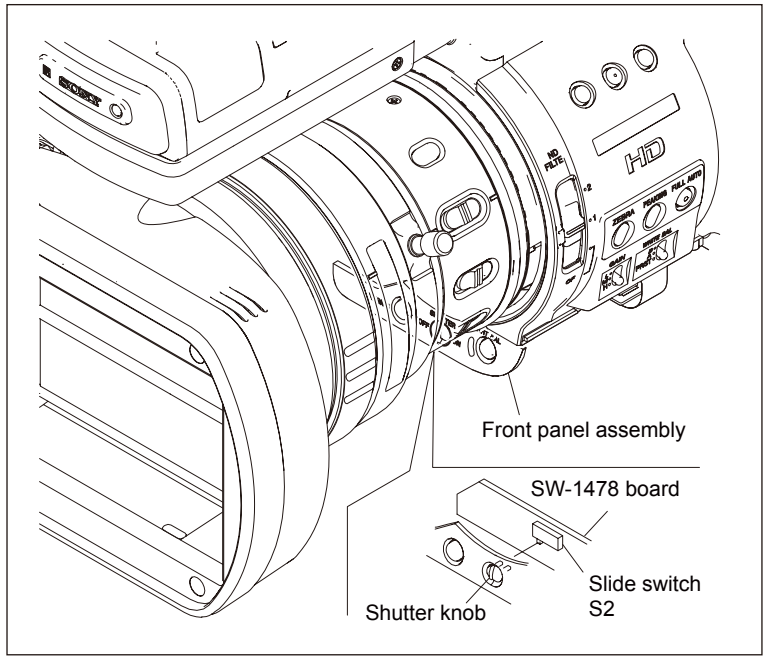
5. Remove the two dowels, and remove the front panel assembly.

6. Reinstall case (bottom) L/R and Front panel assembly by reversing the steps of removal.



Note

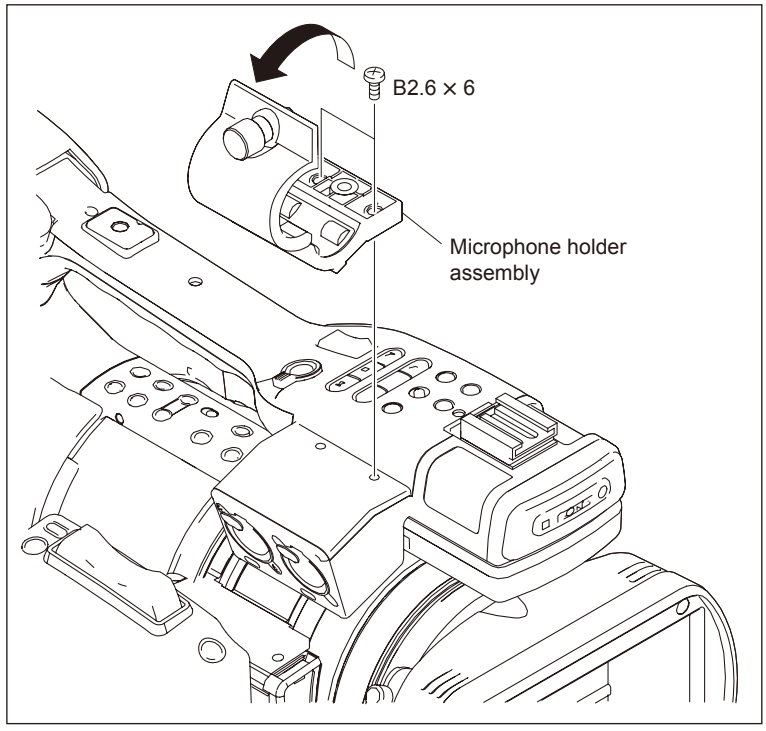
When installing the front panel assembly, check if the position of the slide switch (S2) on the SW-1478 board matches the position of the SHUTTER knob.



2-2-3. Microphone Holder Assembly

1. Open the microphone holder assembly.
2. Remove the two screws, and remove the microphone holder assembly.

3. Reinstall the microphone holder assembly by reversing the steps of removal.

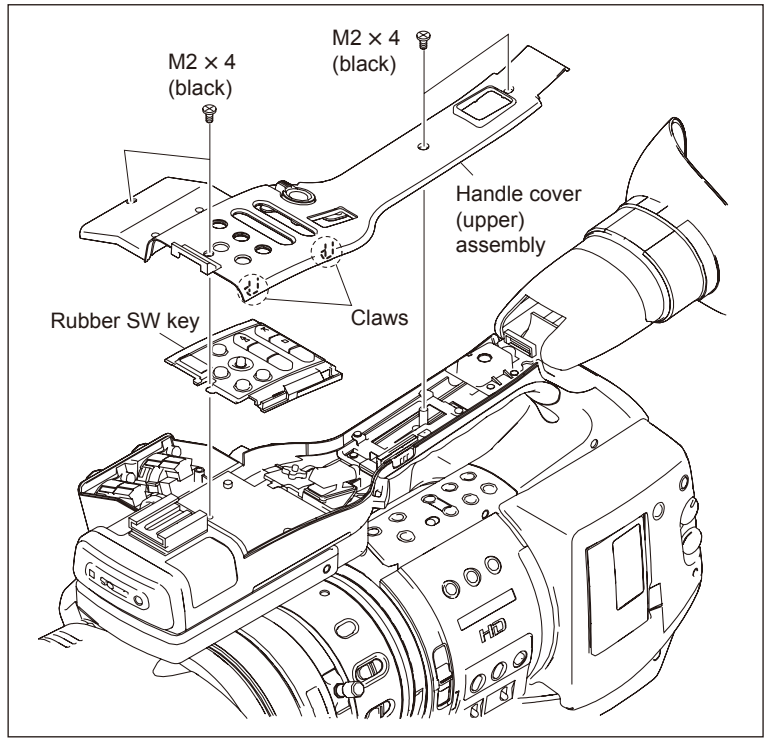


2-2-4. EVF Assembly

1. Remove the microphone holder assembly. (Refer to Section 2-2-3.)
2. Remove the four screws.
3. Disengage the two claws on the front of the handle cover (upper) assembly first. Then remove the rear of the handle cover (upper) assembly from the EVF assembly.

Note

Be careful not to drop the rubber SW key.



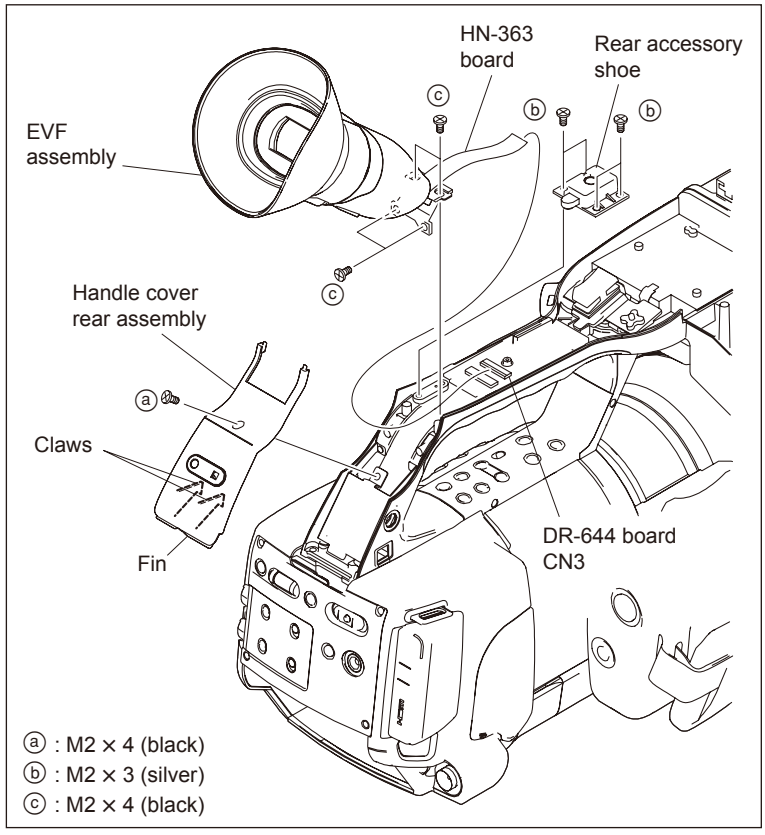
4. Remove the screw of ⓐ.
5. Disengage the two claws and fin, and remove the handle cover rear assembly.
6. Remove the four screws of ⓑ, and remove the rear accessory shoe.
7. Disconnect the HN-363 board from the connector (CN3) on the DR-644 board.

Note

The life of the flexible board and the flexible card wire will be significantly shortened if they are folded. Be very careful not to fold them.

8. Remove the four screws of ⓒ, and remove the EVF assembly.

9. Reinstall the EVF assembly by reversing the steps of removal.

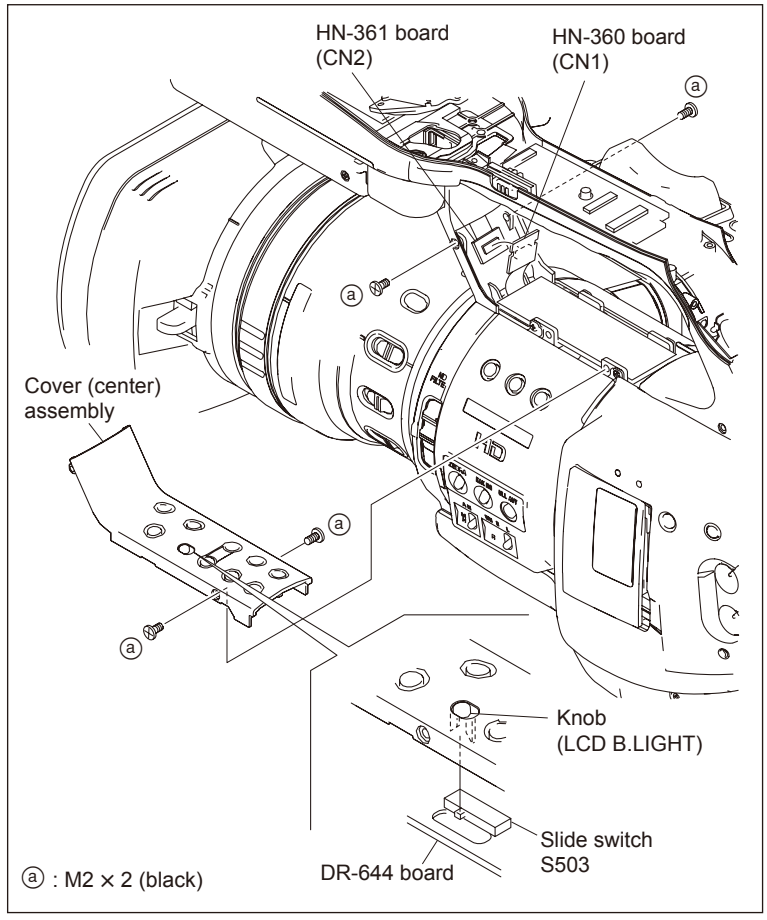


2-2-5. Handle Assembly

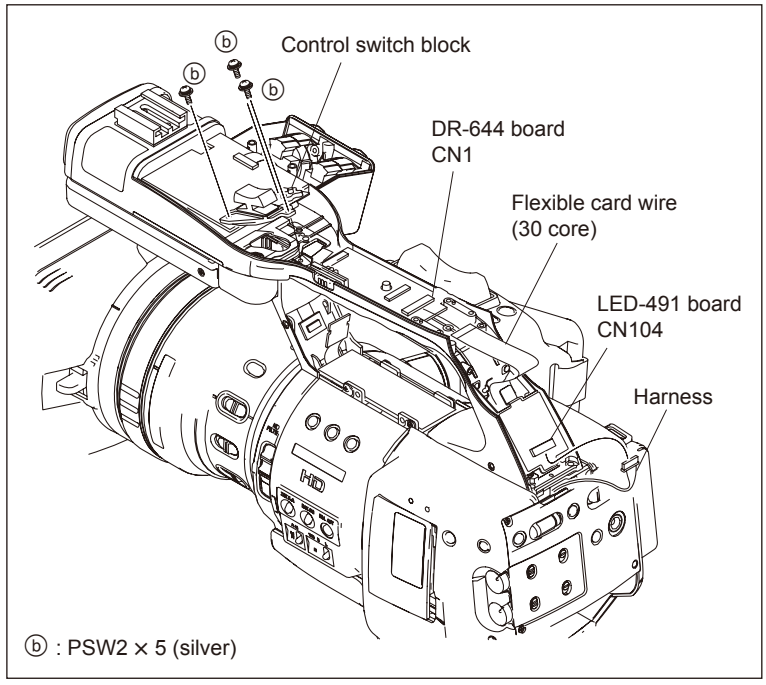
1. Refer to Sections from 2-2-3 to 2-2-4 and disassemble the unit up to "EVF Assembly" removal.
2. Remove the four screws of ⓐ, and remove the cover (center) assembly.
3. Disconnect the connector (CN2) on the HN-361 board from the connector (CN1) on the HN-360 board.

Note

When installing the cover (center) assembly, check if the position of the slide switch (S503) on the DR-644 board matches the position of the knob (LCD B.LIGHT).



4. Disconnect the harness from the connector (CN104) on the LED-491 board.
5. Disconnect the flexible card wire (30 core) from the connector (CN1) on the DR-644 board.
6. Remove the three screws of ⓑ that fix the control switch block.

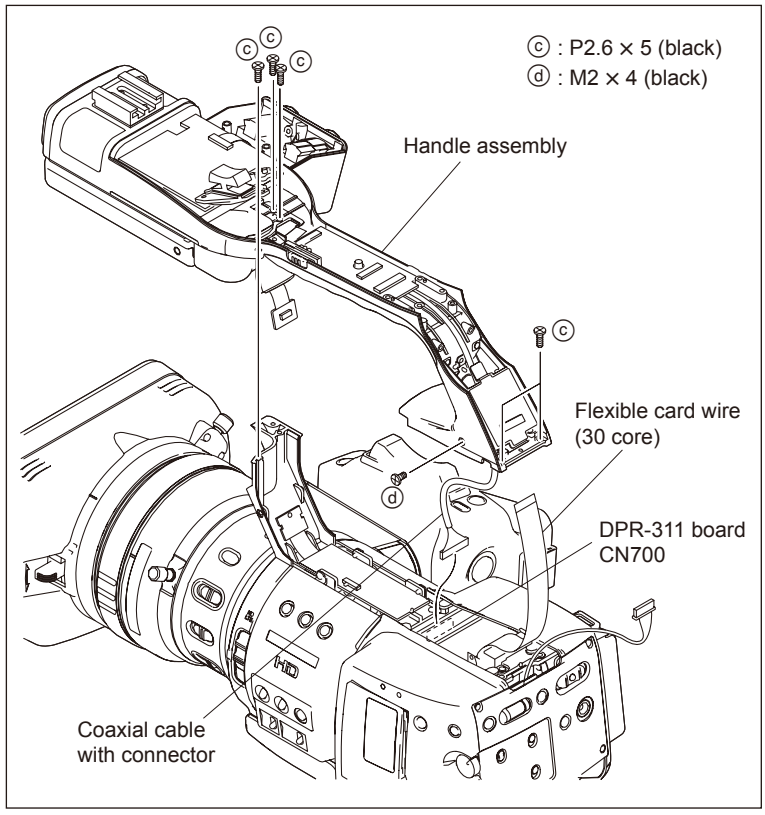


7. Remove the five screws of ⓒ and one screw of ⓓ, and disconnect the coaxial cable with connector from the connector (CN700) on the DPR-311 board.
8. Remove the handle assembly while pulling off the flexible card wire (30 core).

Notes

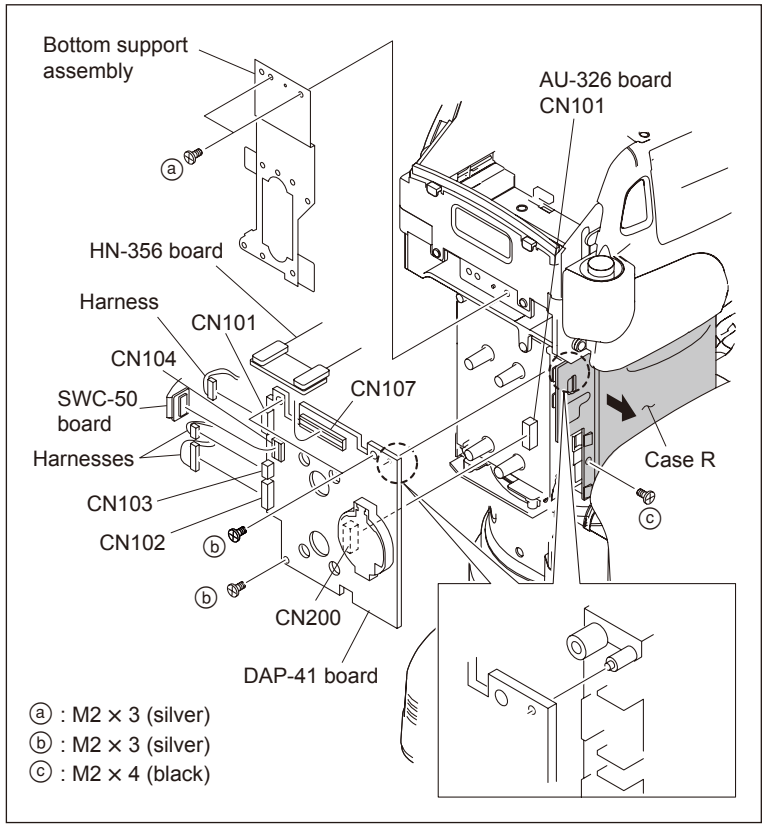
- The coaxial cable with connector uses fine pitch coaxial cables. Be careful when arranging the cable.
- When disconnecting the coaxial cable with connector, do not attempt to remove by pulling the cable. Be sure to hold the connector to remove.

9. Reinstall the handle assembly by reversing the steps of removal.



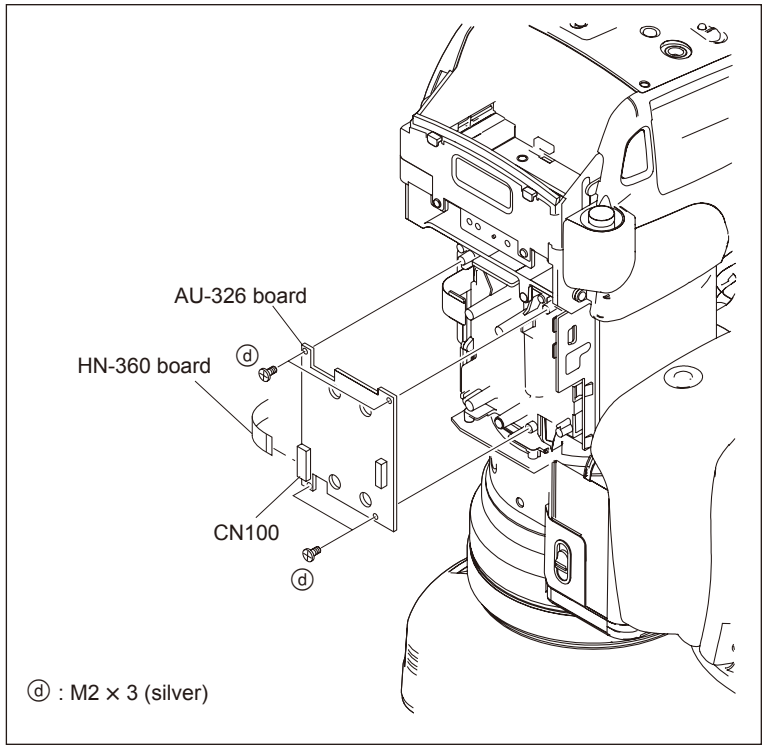
2-2-6. DAP-41 Board and AU-326 Board

1. Refer to Sections from 2-2-1 to 2-2-2 and disassemble the unit up to “Case Bottom L/R and Front Panel Assembly” removal.
2. Remove the two screws of ⓐ, and disassembly the bottom support assembly.
3. Disconnect the SWC-50 board and HN-356 board from the connectors (CN104 and CN107) on the DAP-41 board.
4. Disconnect the harnesses from the connectors (CN101, CN102 and CN103) on the DAP-41 board.
5. Remove the three screws of ⓑ, and disconnect the connector (CN200) on the DAP-41 board from the connector (CN101) on the AU-326 board.
6. Remove the screw of ⓒ.
7. While pushing case R lightly in the direction of the arrow, remove the DAP-41 board.



8. Disconnect the HN-360 board from the connector (CN100) on the AU-326 board.
9. Remove the four screws of ⓓ, and remove the AU-326 board.

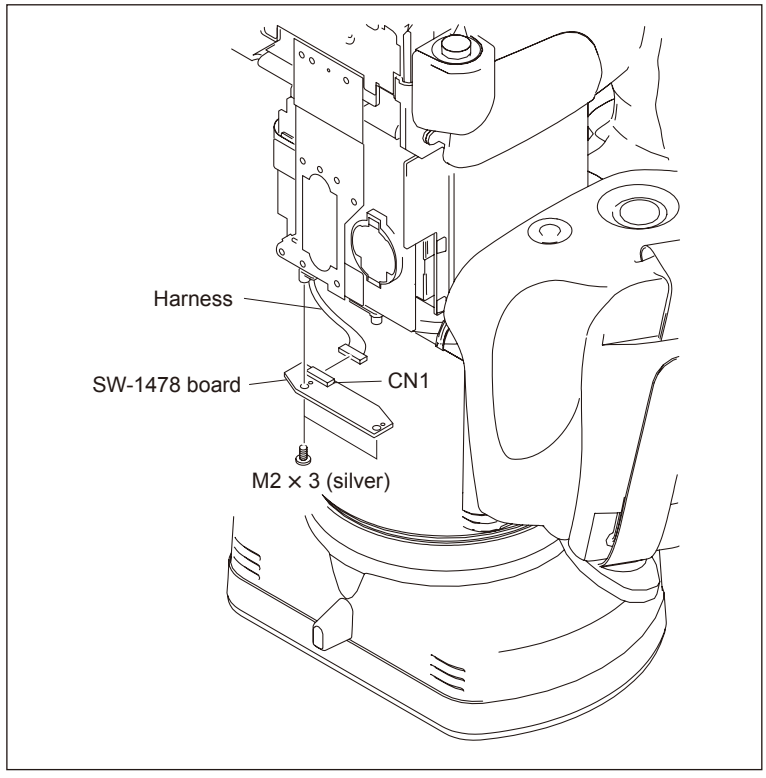
10. Reinstall the DAP-41 board and AU-326 board by reversing the steps of removal.



2-2-7. SW-1478 Board

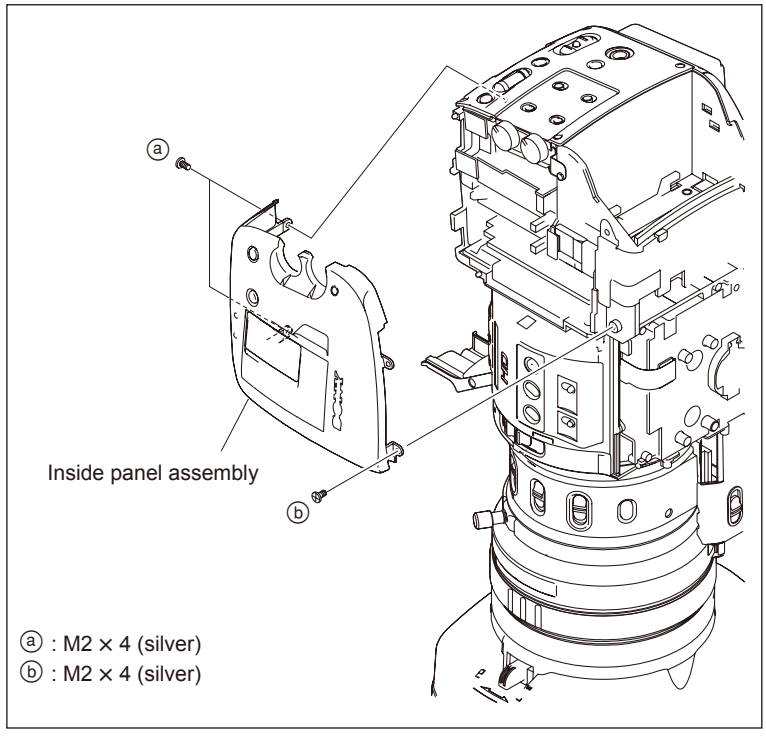
1. Refer to Sections from 2-2-1 to 2-2-2 and disassemble the unit up to "Case Bottom L/R and Front Panel Assembly" removal.
2. Remove the two screws.
3. Disconnect the harness from the connector (CN1) on the SW-1478 board and remove the SW-1478 board.

4. Reinstall the SW-1478 board by reversing the steps of removal.



2-2-8. Inside Panel Assembly/Outside Panel Assembly

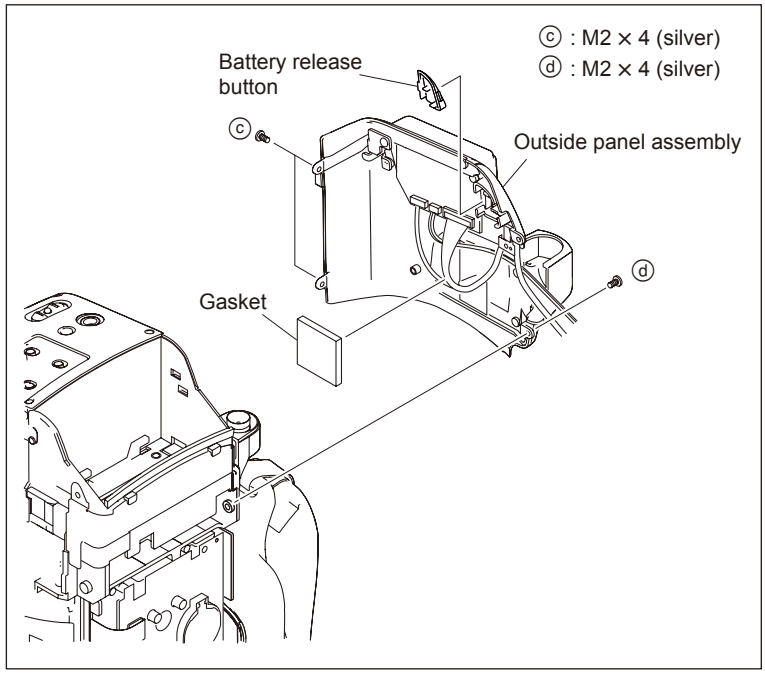
1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to "Handle Assembly" removal.
2. Remove the two screws of ⓐ and one screw of ⓑ, and remove the inside panel assembly.



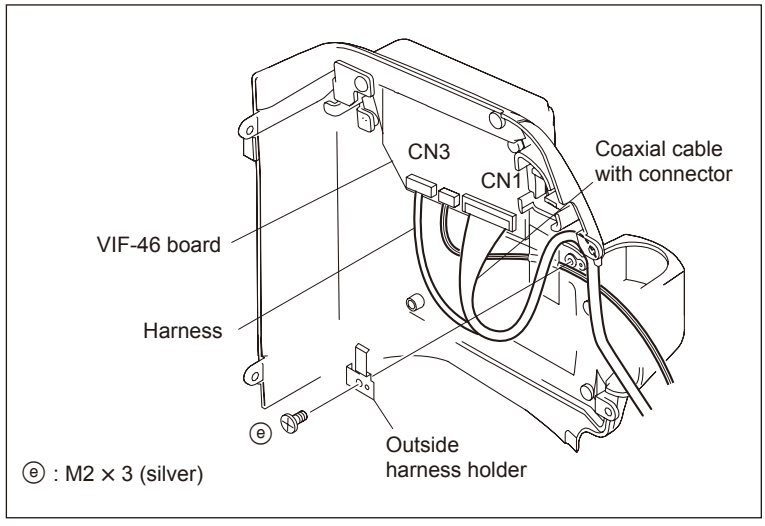
3. Remove the two screws of ⓒ and one screw of ⓓ, and remove the outside panel assembly.

Note

When removing the outside panel assembly, be careful not to drop the battery release button.



4. Remove the screw of ⓔ, and remove the outside harness holder.
5. Disconnect the harness and coaxial cable with connector from the connectors (CN1 and CN3) on the VIF-46 board.

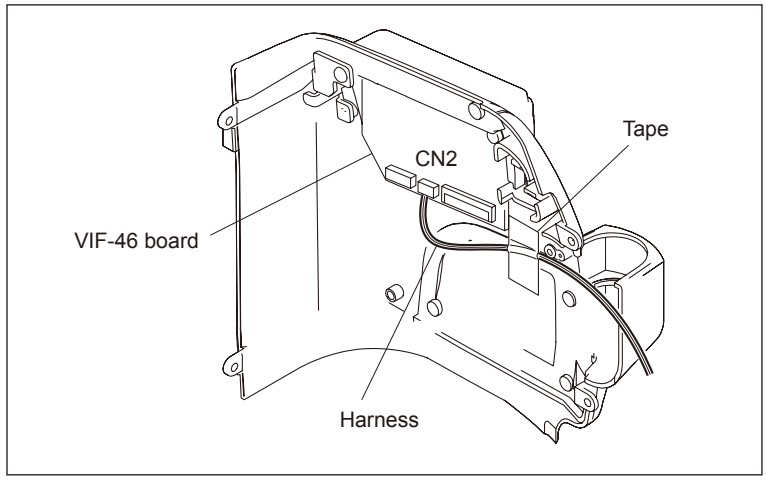


6. Peel off the tape from the inside of the outside panel assembly.
7. Disconnect the harness from the connector (CN2) on the VIF-46 board.

8. Reinstall the inside panel assembly/outside panel assembly by reversing the steps of removal.

Note

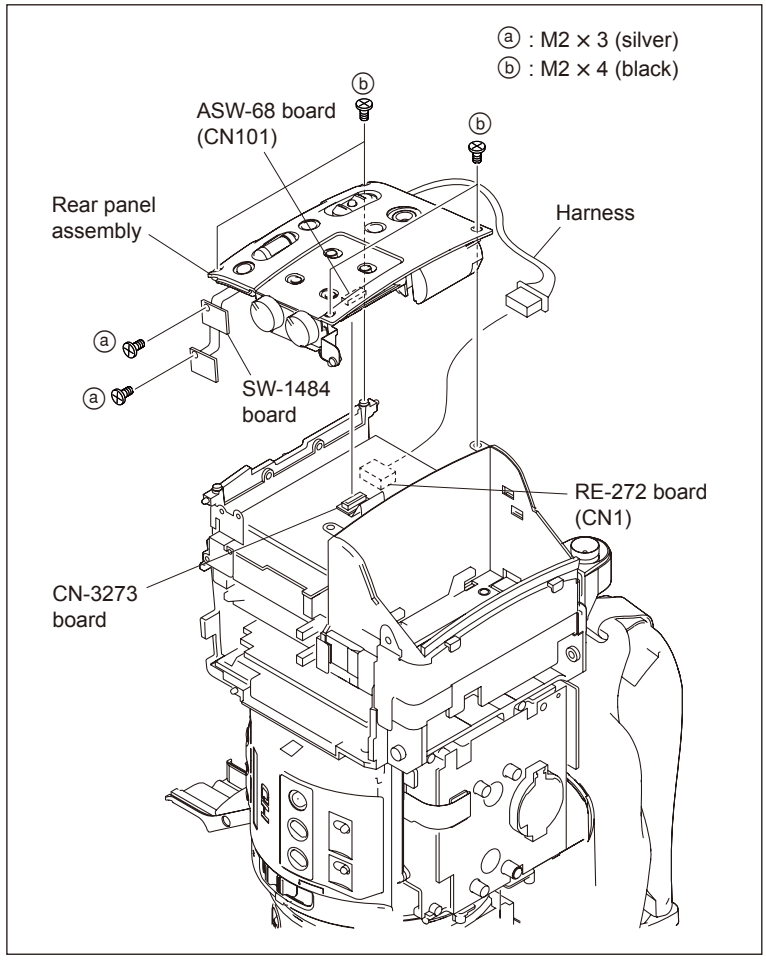
Be careful that no harness should be caught.



2-2-9. Rear Panel Assembly

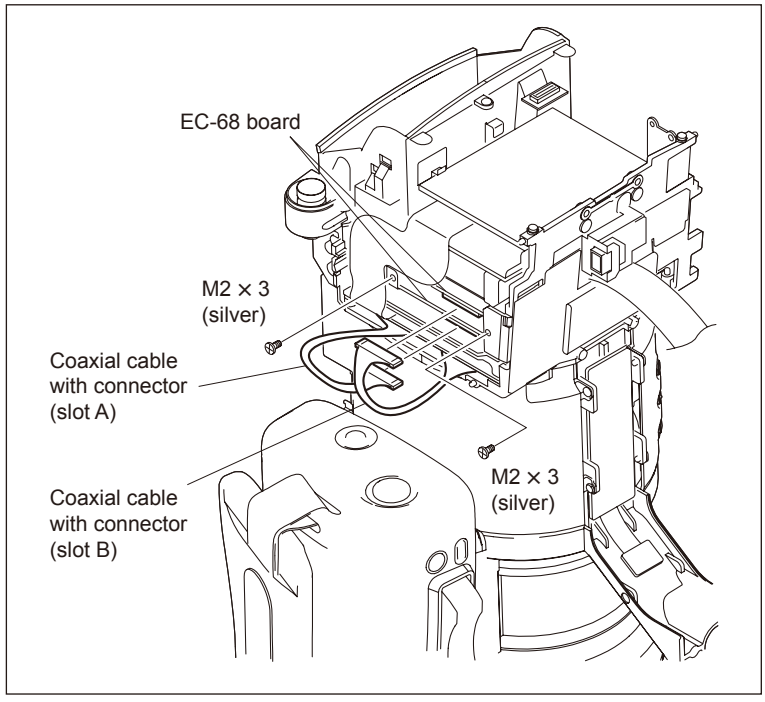
1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Section 2-2-8 and disassemble the unit up to “Inside Panel Assembly/Outside Panel Assembly” removal.
3. Remove the two screws of ⓐ that fix the SW-1484 board.
4. Remove the four screws of ⓑ.
5. Disconnect the harness from the connector (CN1) on the RE-272 board.
6. Disconnect the CN-3273 (flexible board) from the connector (CN101) on the ASW-68 board.

7. Reinstall the rear panel assembly by reversing the steps of removal.



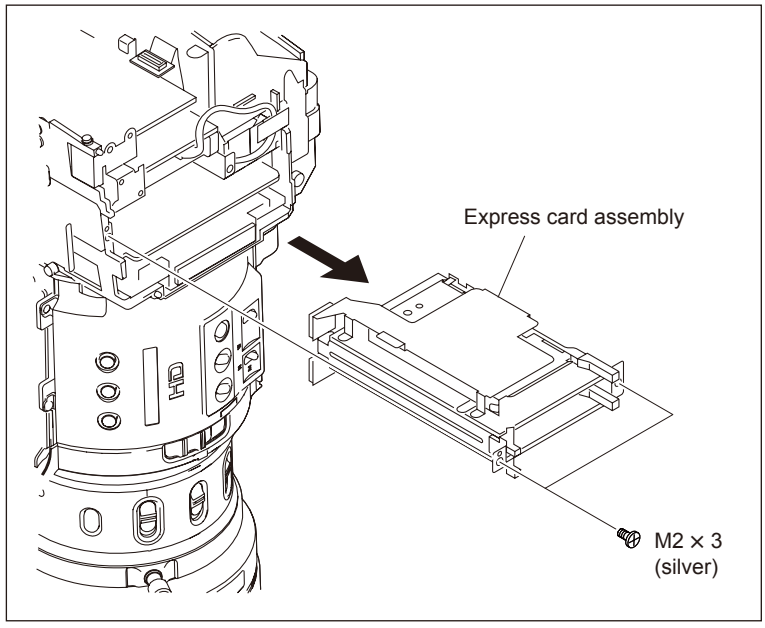
2-2-10. Express Card Assembly

1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Sections from 2-2-8 to 2-2-9 and disassemble the unit up to “Rear Panel Assembly” removal.
3. Disconnect the coaxial cable with connectors from connectors on the two EC-68 boards.
4. Remove the two screws.



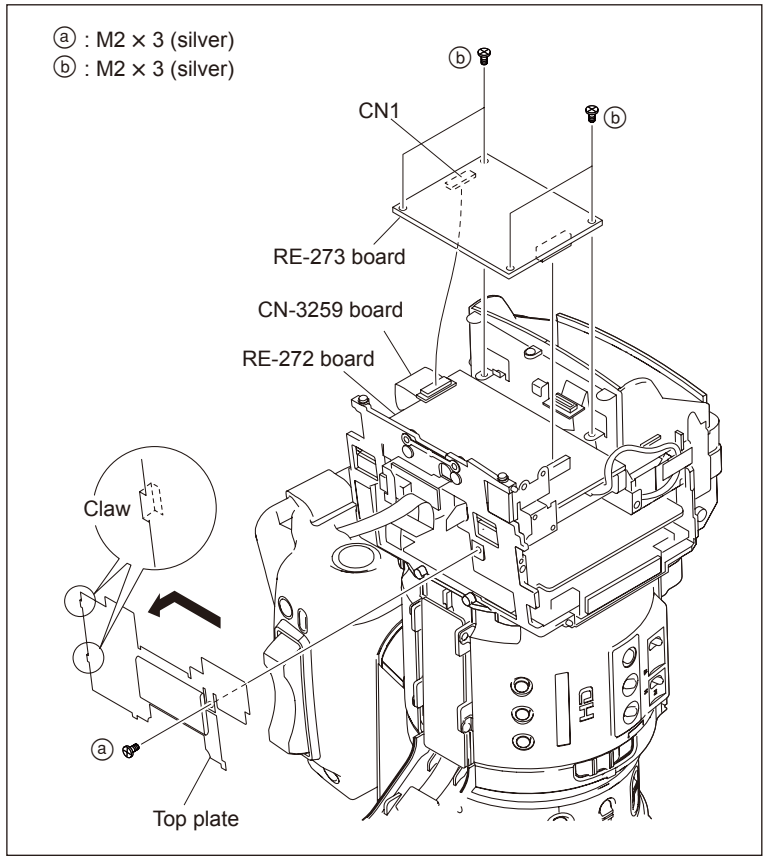
5. Remove the two screws, and remove the express card assembly in the direction of the arrow.

6. Reinstall the express card assembly by reversing the steps of removal.



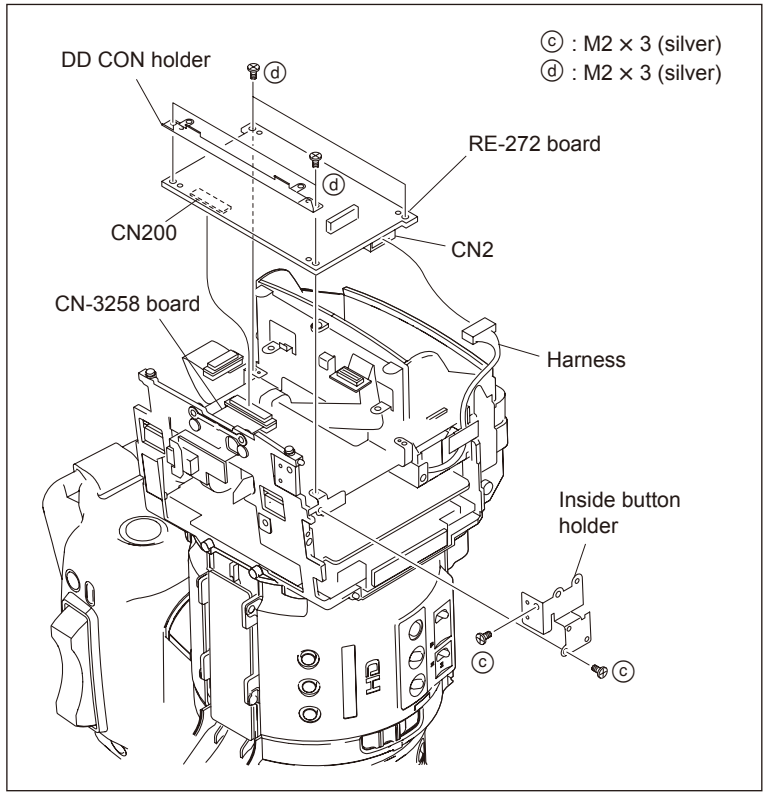
2-2-11. RE-272 Board and RE-273 Board

1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Sections from 2-2-8 to 2-2-10 and disassemble the unit up to “Express Card Assembly” removal.
3. Remove the screw of ⓐ, and remove the top plate in the direction of the arrow.
4. Remove the four screws of ⓑ.
5. Disconnect the connector that connects the RE-272 board and the RE-273 board.
6. Disconnect the CN-3259 (flexible board) from the connector (CN1) on the RE-273 board, and remove the RE-273 board.



7. Remove the two screws of ⓒ, and remove the inside button holder.
8. Remove the four screws of ⓓ, and remove the DD CON holder.
9. Disconnect the harnesses from the connector (CN2) on the RE-272 board.
10. Disconnect the CN-3258 (flexible board) from the connector (CN200) on the RE-272 board, and remove the RE-272 board.

11. Reinstall the RE-272 board and RE-273 board by reversing the steps of removal.

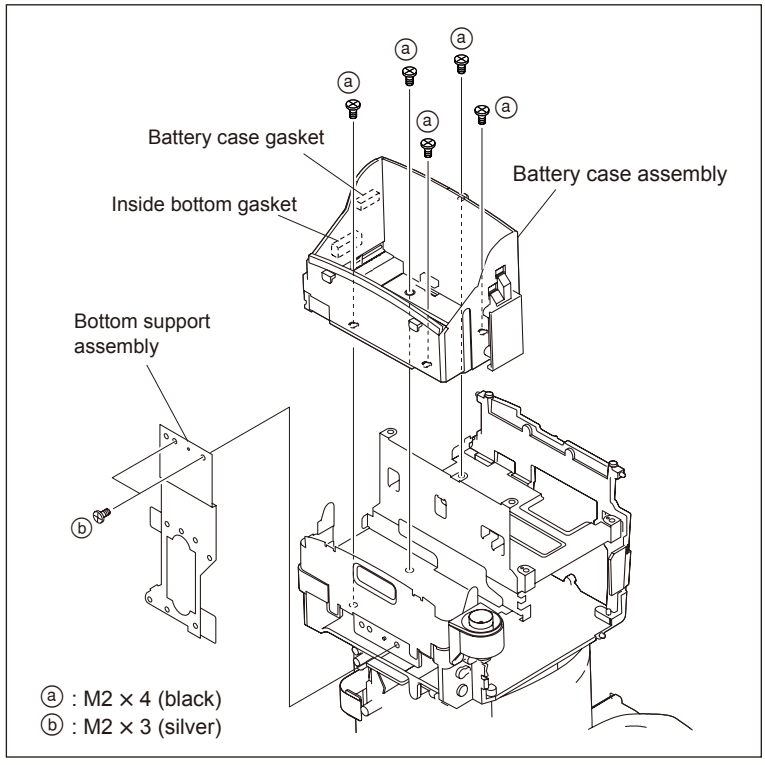


2-2-12. Battery Case, TX-131 Board

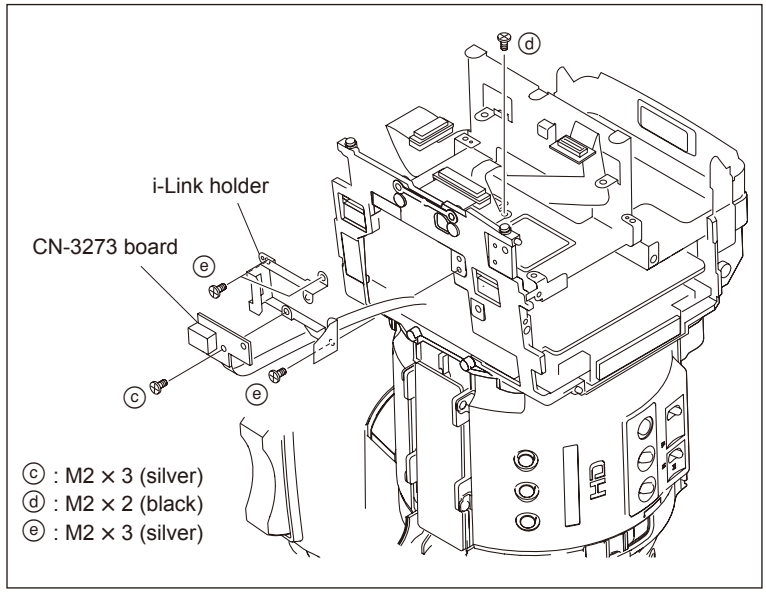
1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Sections from 2-2-8 to 2-2-11 and disassemble the unit up to “RE-272 Board and RE-273 Board” removal.
3. Remove the five screws of ⓐ, and remove the battery case assembly.
4. Remove the two screws of ⓑ, and remove the bottom support assembly.

Note

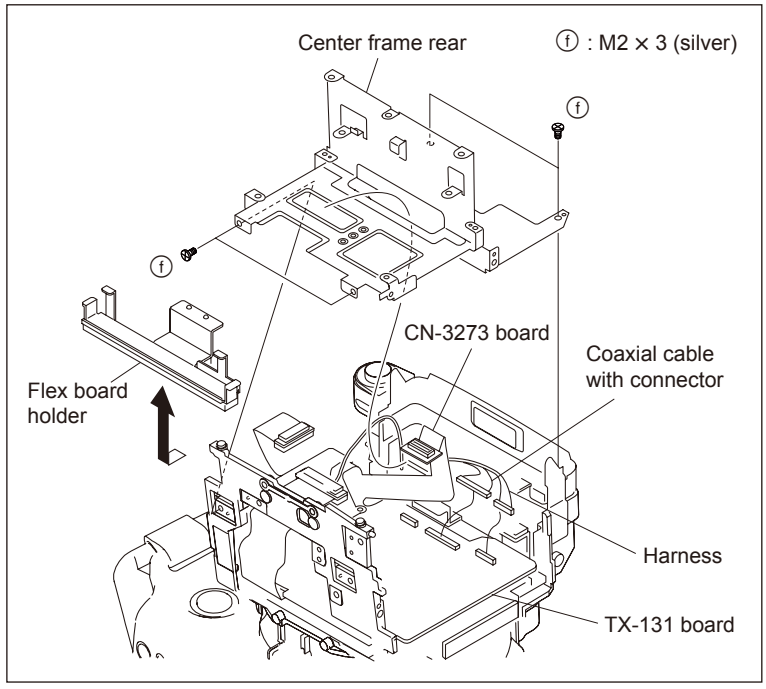
When replacing the battery case assembly, be sure to also replace the battery case gasket and the inside bottom gasket at the same time.



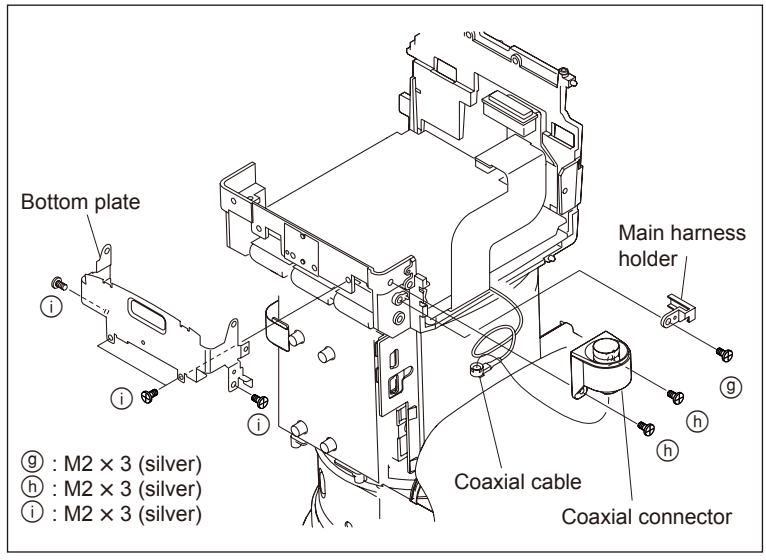
5. Remove the screw of ⓒ, and remove the CN-3273 board from the i-Link holder.
6. Remove the screw of ⓓ.
7. Remove the three screws of ⓔ, and remove the i-Link holder.



8. Remove the four screws of ⓕ.
9. Remove the center frame rear carefully not to damage the CN-3273 board.
10. Remove the flex board holder in the direction of the arrow.
11. Disconnect the harness and coaxial cable with connector from the connectors on the TX-131 board.

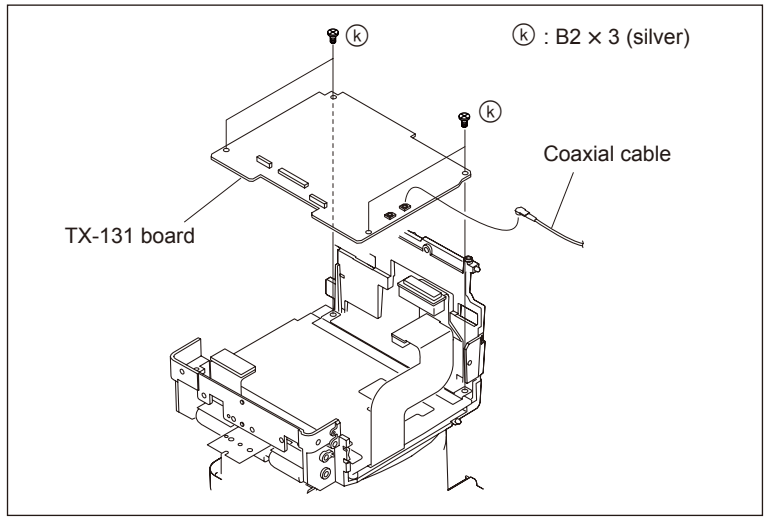


12. Remove the screw of ⓖ, and remove the main harness holder.
13. Disconnect the coaxial cable from the coaxial connector.
14. Remove the two screws of ⓗ, remove the coaxial connector.
15. Remove the four screws of ⓘ, remove the bottom plate.



16. Disconnect the coaxial cable from the connector on the TX-131 board.
17. Remove the four screws of ⓚ, and remove the TX-131 board.

18. Reinstall the battery case and the TX-131 board by reversing the steps of removal.



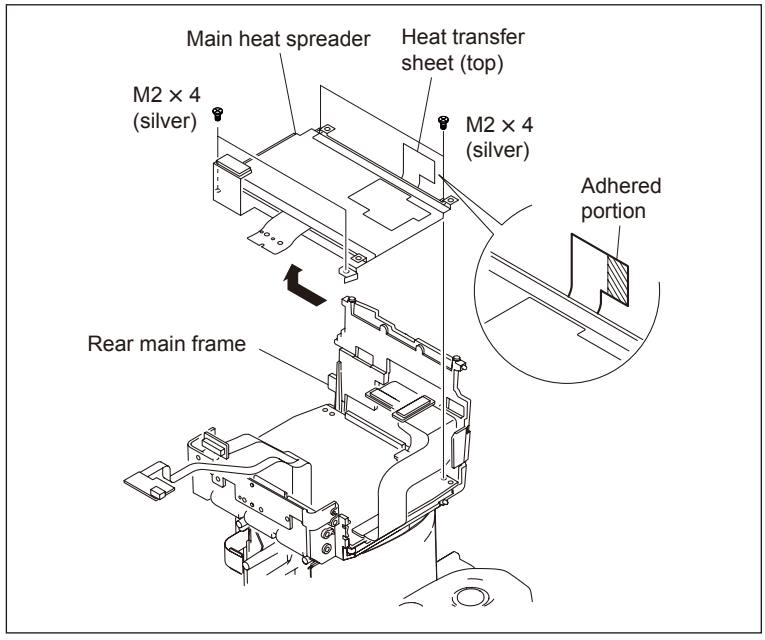
2-2-13. DPR-311 Board

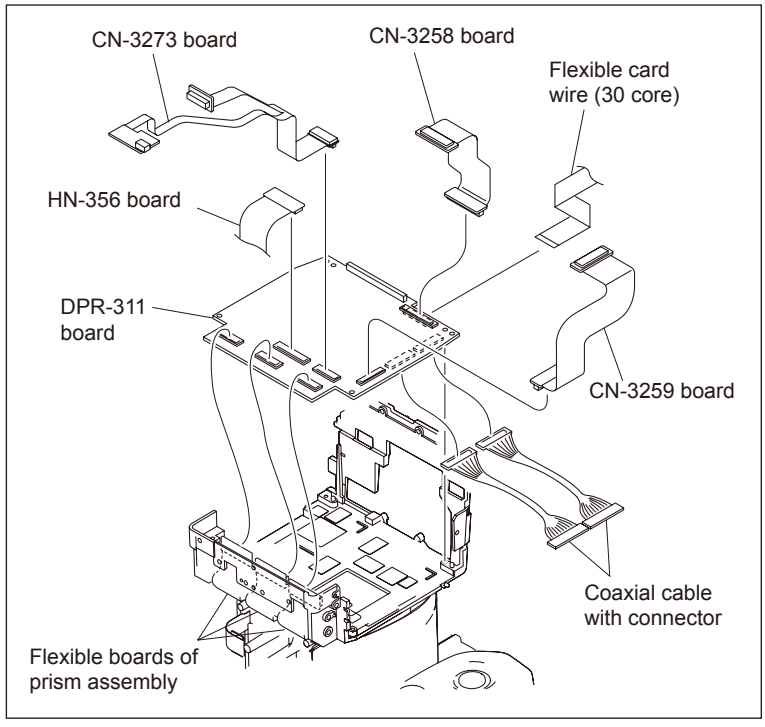
1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Sections from 2-2-8 to 2-2-12 and disassemble the unit up to “Battery Case, TX-131 Board” removal.
3. Peel off the portion of the heat transfer sheet (top) (▨ portion) that is adhered to the rear main frame.

   Note

   The characteristic of the heat transfer sheet (carbon sheet) deteriorates if it is damaged or folded. Be careful when handling it.

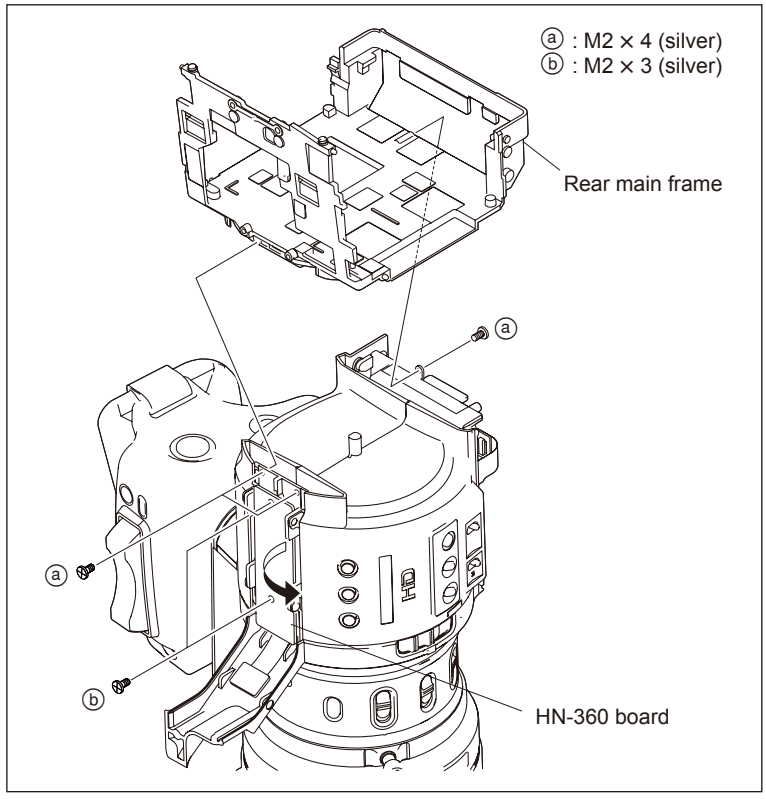
4. Remove the four screws, and remove the main heat spreader.
5. Disconnect the CN-3258 board, CN-3259 board, CN-3273 board and HN-356 board from the connectors on the DPR-311 board.
6. Disconnect the flexible boards of prism assembly from the three connectors on the DPR-311 board.
7. Disconnect the flexible card wire (30 core) and two coaxial cable with connectors from the connectors on the DPR-311 board.
8. Remove the DPR-311 board.
9. Reinstall the DPR-311 board by reversing the steps of removal.



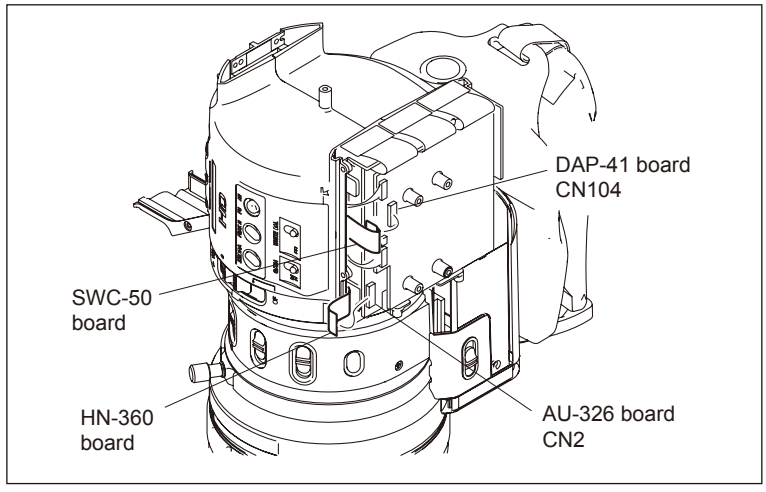


2-2-14. Case L Assembly

1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Sections from 2-2-8 to 2-2-13 and disassemble the unit up to “DPR-311 Board” removal.
3. Remove the three screws of ⓐ, and remove the rear main frame.
4. Remove the two screws of ⓑ, and remove the HN-360 board in the direction of the arrow.



5. Disconnect the SWC-50 board from the connector (CN104) on the DAP-41 board.
6. Disconnect the HN-360 board from the connector (CN2) on the AU-326 board.

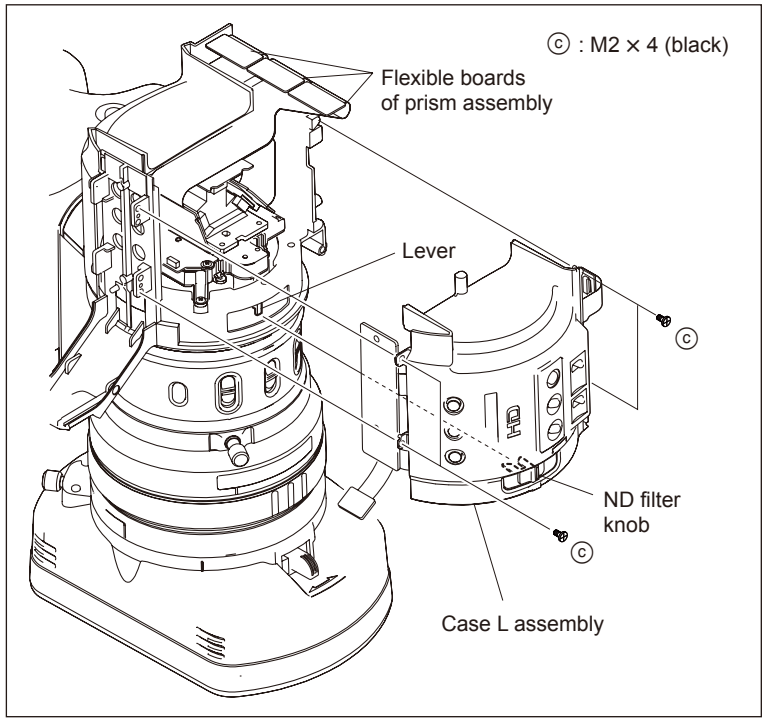


7. Remove the four screws of ⓒ.
8. Remove the case L assembly carefully not to damage the flexible board.

9. Reinstall the case L assembly by reversing the steps of removal.

Notes

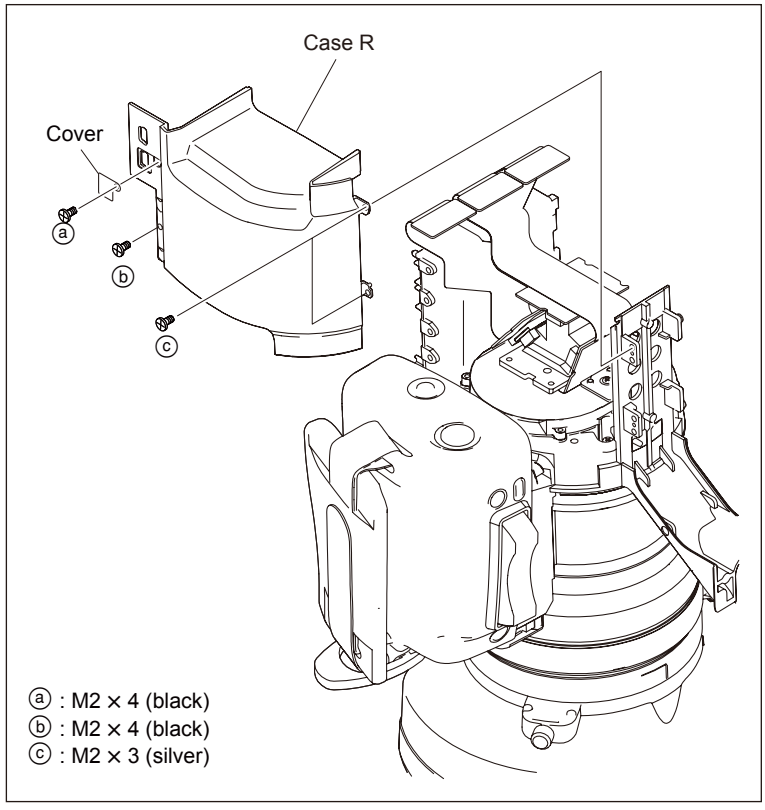
- Check if the position of the ND filter knob matches the position of the lever.
- Be careful with the position of the flexible board from the prism block when installing the case L assembly.



2-2-15. Case R

1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Sections from 2-2-8 to 2-2-14 and disassemble the unit up to “Case L Assembly” removal.
3. Remove the screw of ⓐ, and remove the cover.
4. Remove the one screw of ⓑ and two screws of ⓒ, and remove the case R.

5. Reinstall the case R by reversing the steps of removal.



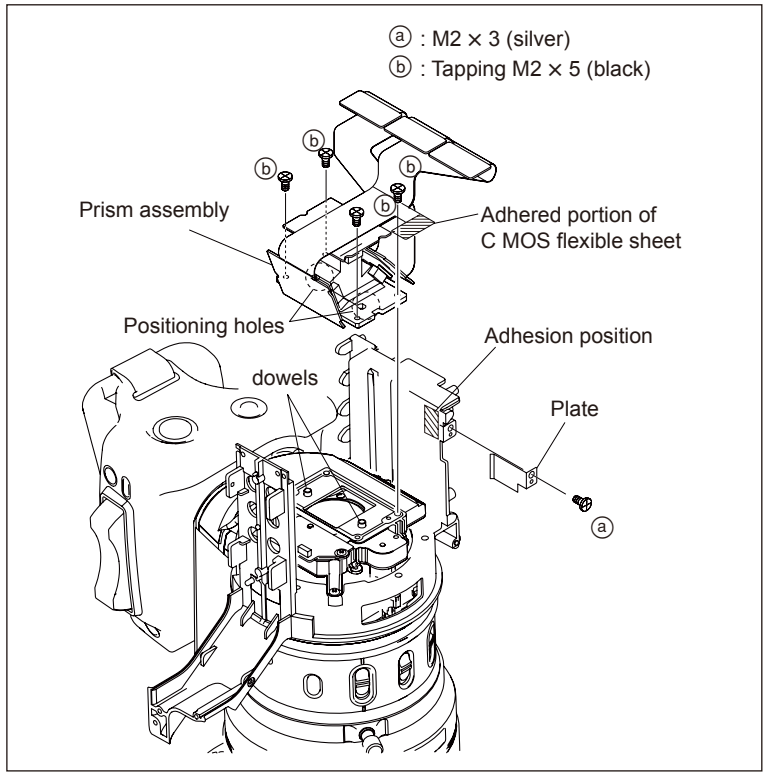
2-2-16. Prism Assembly

1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Sections from 2-2-8 to 2-2-15 and disassemble the unit up to “Case R” removal.
3. Remove the screw of ⓐ, and remove the plate.
4. Peel off the adhered portion of the C MOS flexible sheet.
5. Remove the four screws of ⓑ, and remove the prism assembly.

6. Reinstall the prism assembly by reversing the steps of removal.

Note

When installing, check that the two positioning holes of the prism assembly are aligned with the dowels.



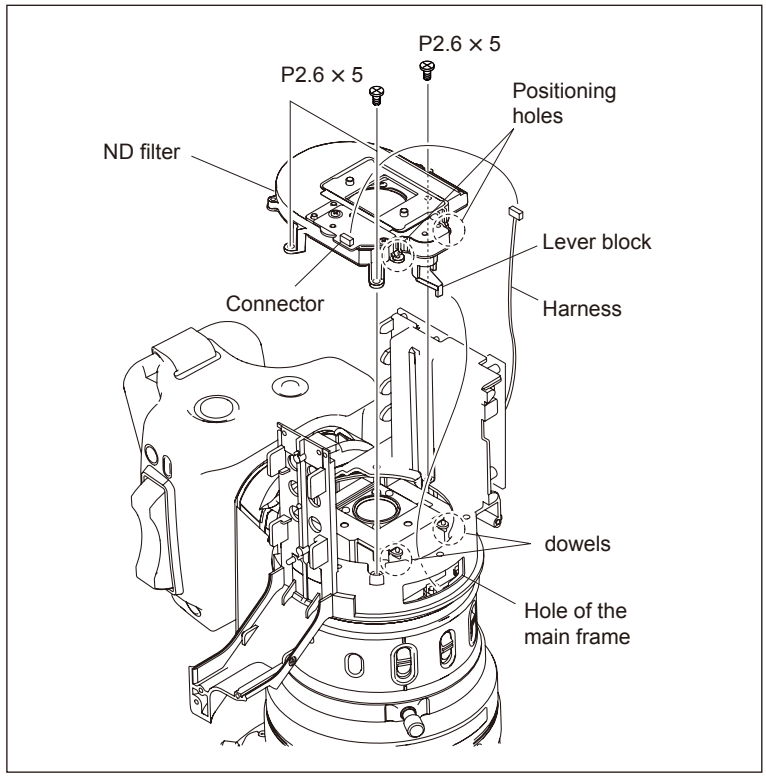
2-2-17. ND Filter

1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Sections from 2-2-8 to 2-2-16 and disassemble the unit up to “Prism Assembly” removal.
3. Disconnect the harness from the connector on the ND filter.
4. Remove the three screws and remove the ND filter by drawing the lever block of the ND filter out of the hole of the main frame.

5. Reinstall the ND filter by reversing the steps of removal.

Notes

- When installing, check that the two positioning holes of the ND filter are aligned with the dowels.
- When reinstalling the ND filter, loosely fix the three screws, and then fully tighten them while paying attention not to deform the ND filter.



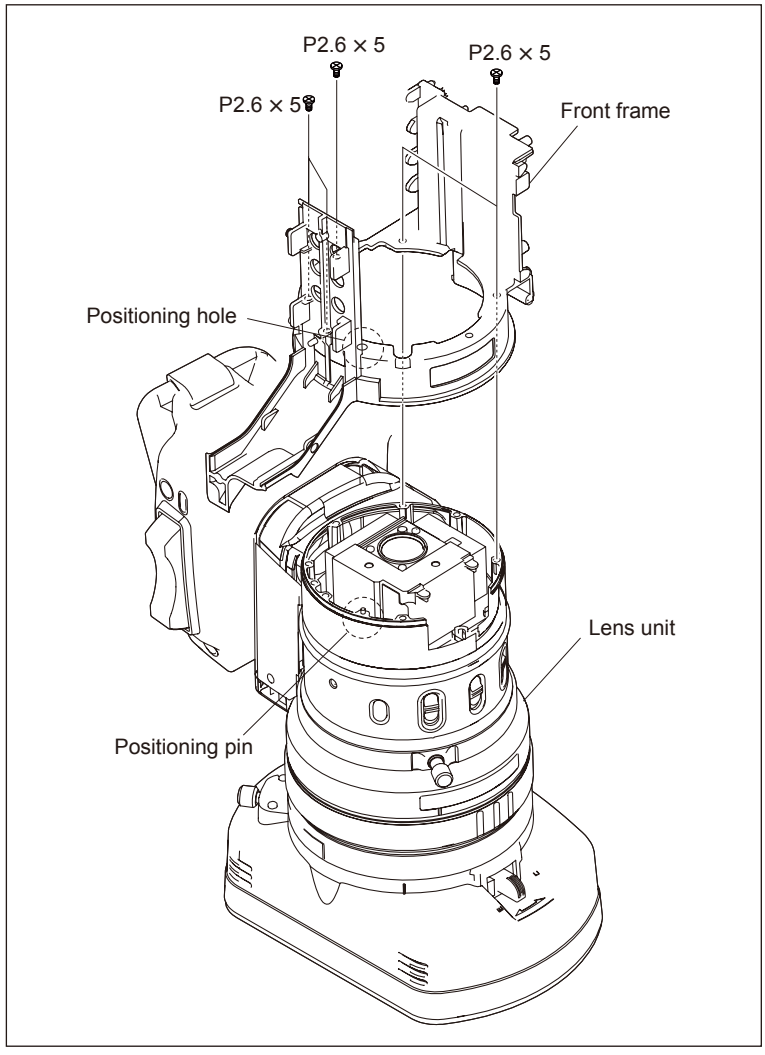
2-2-18. Lens Unit

1. Refer to Sections from 2-2-1 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Sections from 2-2-8 to 2-2-17 and disassemble the unit up to “ND filter” removal.
3. Remove the five screws, and remove the front frame.

4. Reinstall the lens unit by reversing the steps of removal.

   Note

   When installing, align the positioning pin of the lens unit with the positioning hole of the main frame.



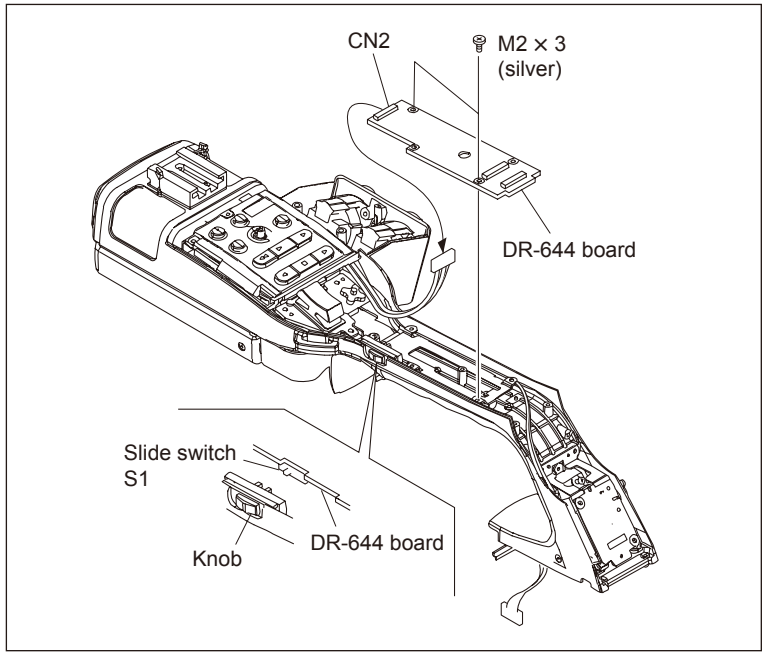
2-2-19. DR-644 Board

1. Refer to Sections from 2-2-3 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Disconnect the harnesses from the connector (CN2) on the DP-644 board.
3. Remove the two screws, and remove the DR-644 board.

4. Reinstall the DR-644 board by reversing the steps of removal.

   Note

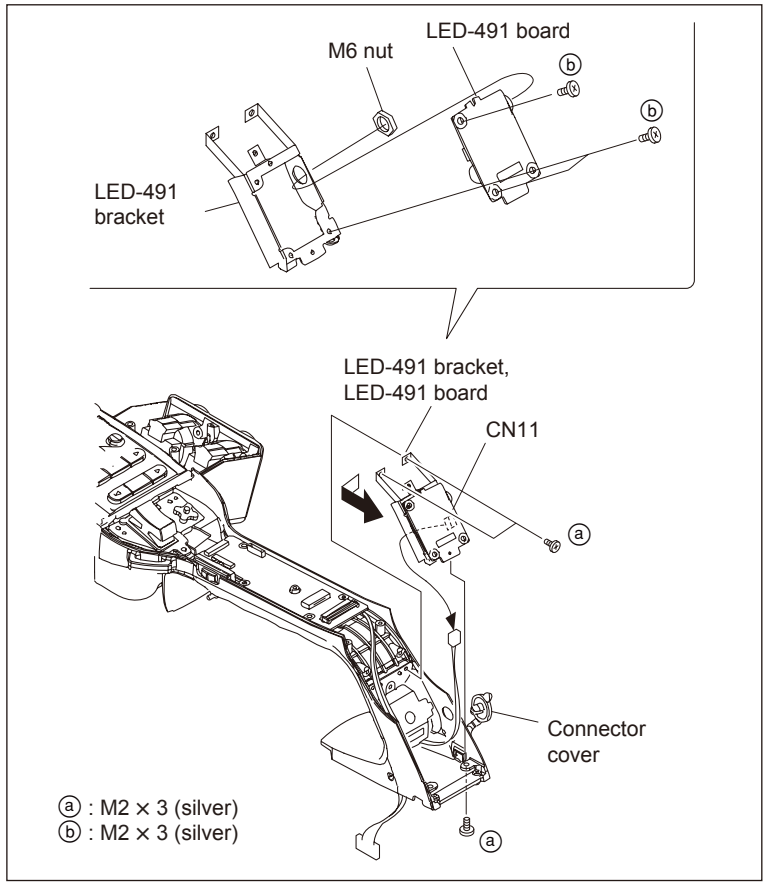
   When installing the DR-644 board, check if the position of the slide switch (S1) on the DR-644 board matches the position of the knob.



2-2-20. LED-491 Board

1. Refer to Sections from 2-2-3 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Remove the connector cover from the headphone jack of the LED-491 board.
3. Remove the three screws of ⓐ, and remove the LED-491 bracket and the LED-491 board in the direction of the arrow.
4. Remove the three screws of ⓑ and the M6 nut, and remove the LED-491 bracket.
5. Disconnect the harness from the connector (CN11) on the LED-491 board, and remove the LED-491 board.

6. Reinstall the LED-491 board by reversing the steps of removal.



2-2-21. Speaker

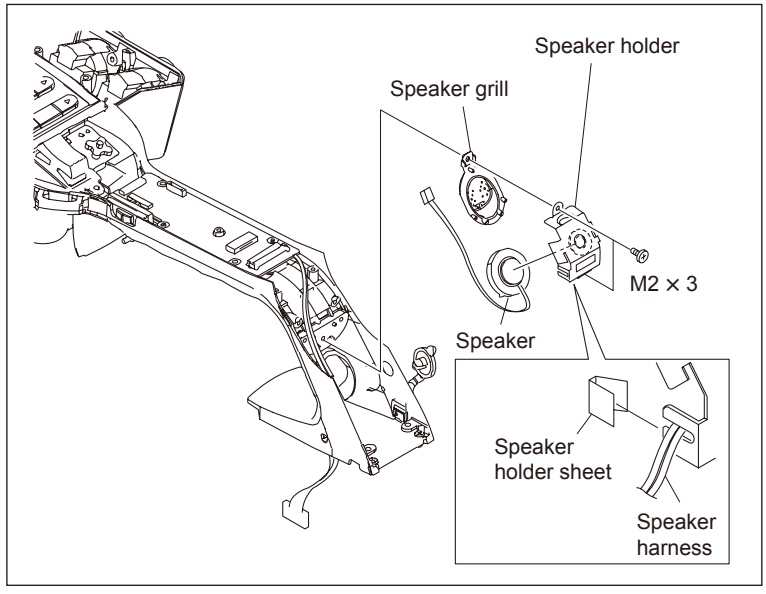
1. Refer to Sections from 2-2-3 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Section 2-2-20 and disassemble the unit up to “LED-491 board” removal.
3. Remove the two screws, and remove the speaker holder.

   Note

   Be careful not to drop the speaker grill.

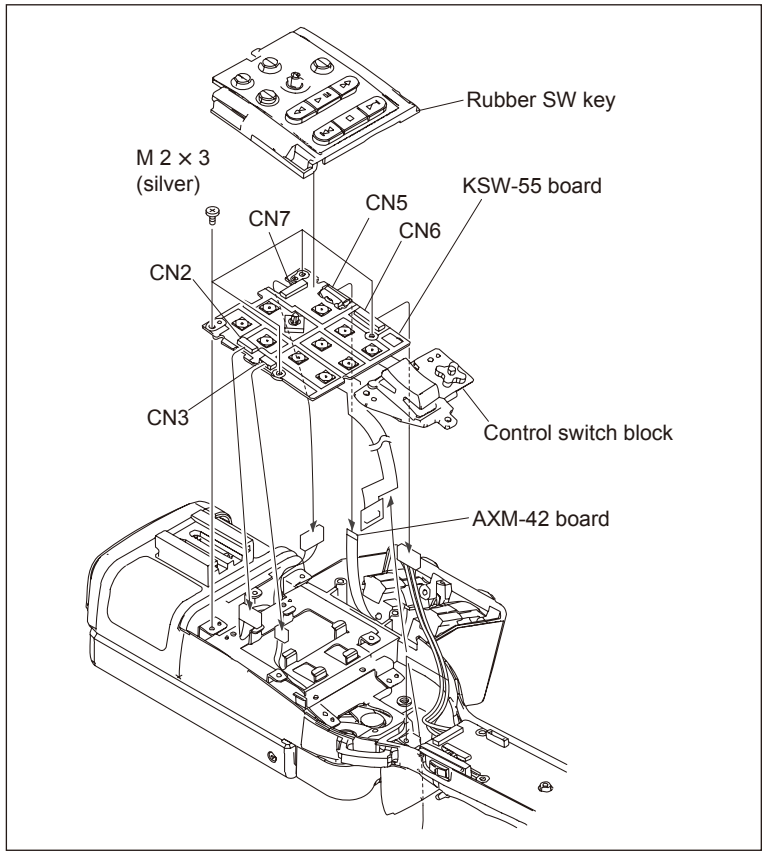
4. Remove the speaker holder sheet, and remove the speaker harness from the slit of the speaker holder.
5. Remove the speaker from the speaker holder.

6. Reinstall the speaker by reversing the steps of removal.

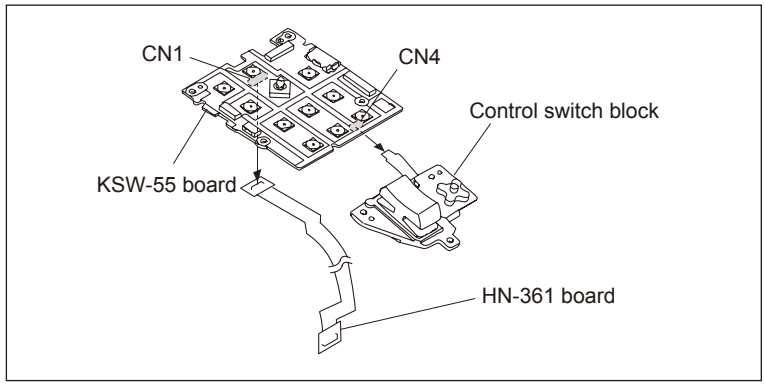


2-2-22. KSW-55 Board, HN-361 Board

1. Refer to Sections from 2-2-3 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Remove the rubber SW key.
3. Disconnect the harnesses and AXM-42 board from the connectors (CN2, CN3, CN5, CN6, CN7) on the KSW-55 board.
4. Remove the four screws, and remove the KSW-55 board.



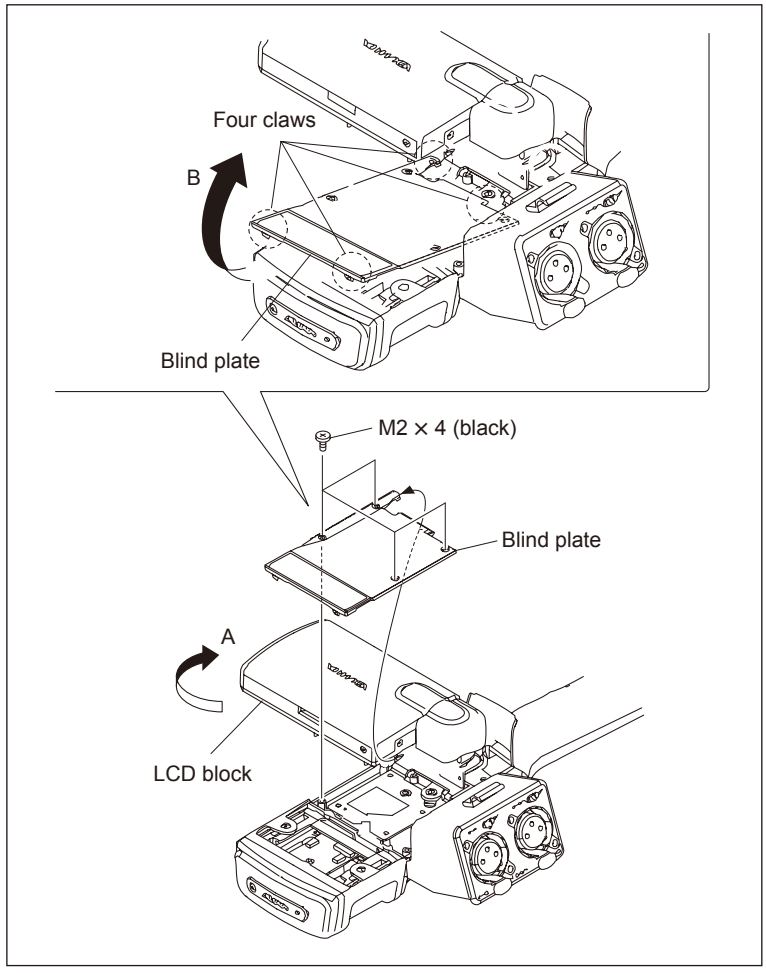
5. Disconnect the control switch block from the connector (CN4) on the KSW-55 board.
6. Disconnect the HN-361 board from the connector (CN1) on the KSW-55 board.



7. Reinstall the KSW-55 board and HN-361 board by reversing the steps of removal.

2-2-23. Microphone Unit Assembly

1. Refer to Sections from 2-2-3 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Section 2-2-22 and disassemble the unit up to “KSW-55 board, HN-361 board” removal.
3. Turn the LCD block in the direction of arrow “A”.
4. Remove the four screws and disengage the four claws, and remove the blind plate in the direction of arrow “B”.

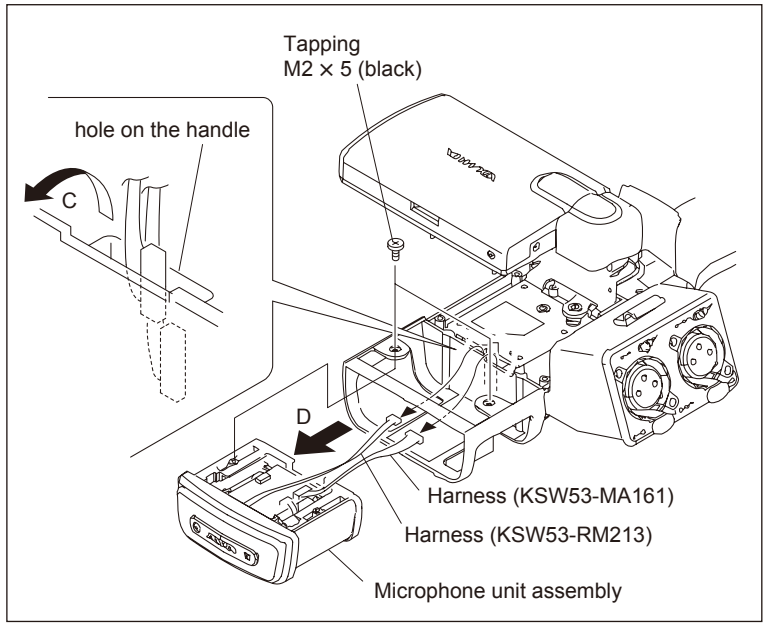


5. Remove the two screws.
6. Pull out the harness (KSW53-MA161) and the harness (KSW53-RM213) from the hole on the handle in the direction of arrow “C”.
7. Remove the microphone unit assembly in the direction of arrow “D”.

Note

Be careful not to hook or damage the harnesses.

8. Reinstall the microphone unit assembly by reversing the steps of removal.

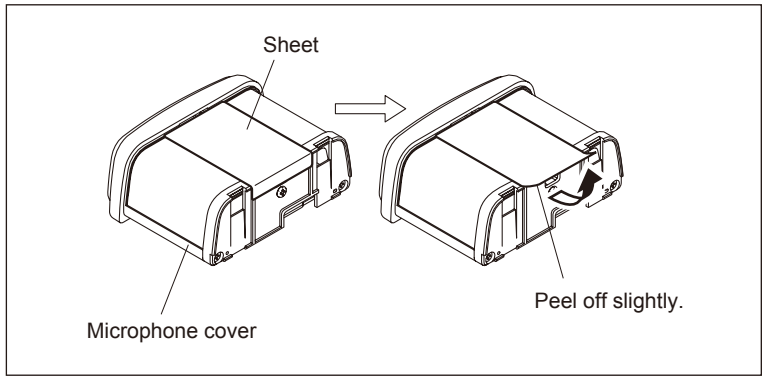


2-2-24. Microphone Unit

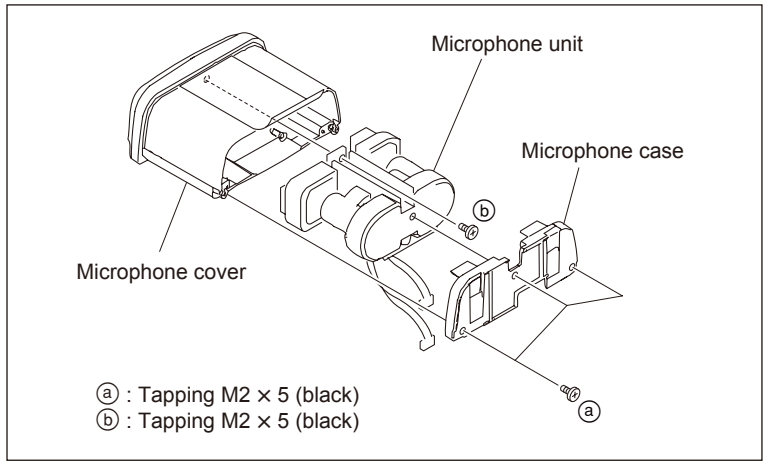
1. Refer to Sections from 2-2-3 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Refer to Sections from 2-2-22 to 2-2-23 and disassemble the unit up to “Microphone Unit Assembly” removal.
3. Slightly peel off the sheet attached to the microphone cover.

   Note

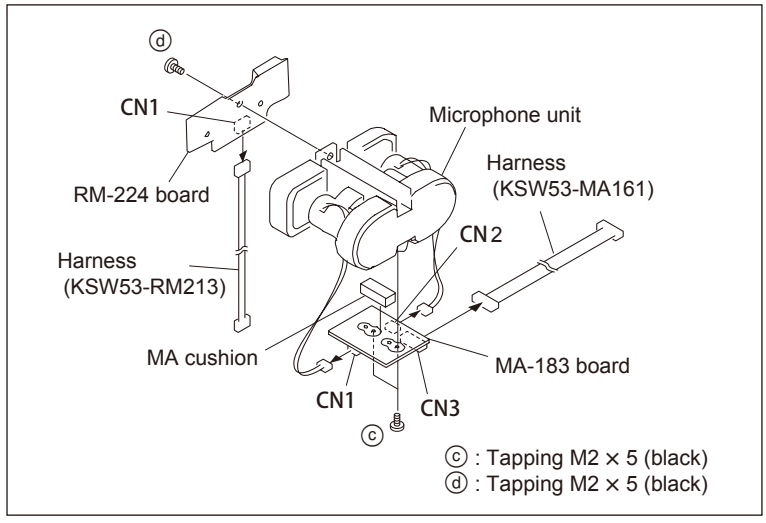
   When reinstalling the microphone unit, attach the sheet to the original position.



4. Remove the three screws of ⓐ, and remove the microphone case.
5. Remove the screw of ⓑ, and remove the microphone cover.



6. Disconnect the harness (KSW53-MA161) (CN3) and the microphone unit harness (CN1, CN2) from the MA-183 board.
7. Remove the two screws of ⓒ, and remove the MA-183 board.
8. Disconnect the harnesses (KSW53-RM213) (CN1) from the RM-224 board.
9. Remove the screw of ⓓ, and remove the RM-224 board.



10. Reinstall the microphone unit by reversing the steps of removal.

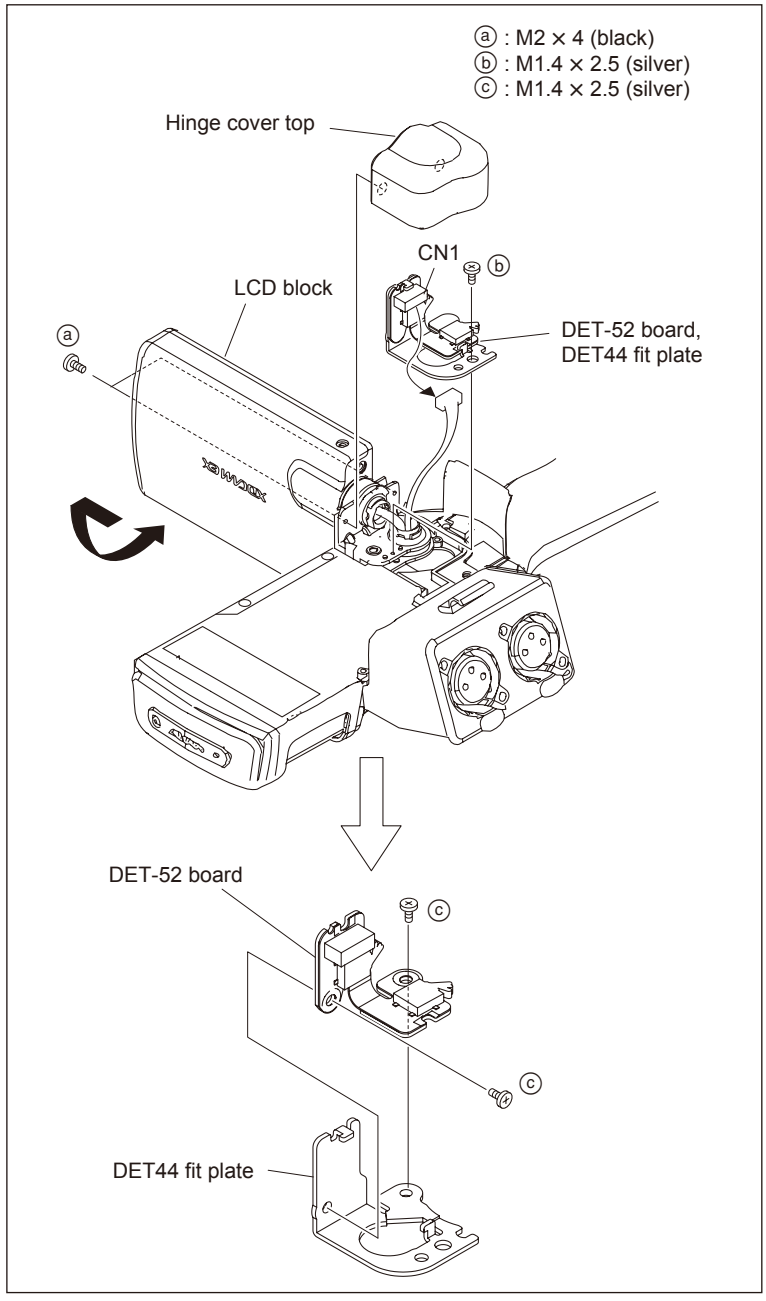
    Note

    When assembling, attach the MA CUSHION to the original place.

2-2-25. DET-52 Board

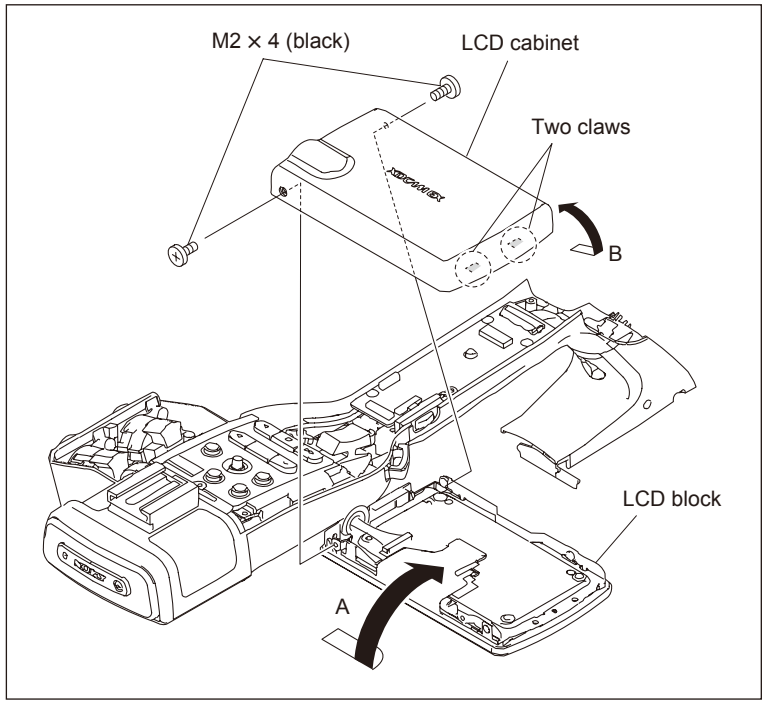
1. Refer to Sections from 2-2-3 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Turn the LCD block in the direction of the arrow.
3. Remove the two screws of ⓐ, and remove the hinge cover top.
4. Disconnect the harnesses (CN1) from the connector on the DET-52 board.
5. Remove the screw of ⓑ, and remove the DET-52 board and the DET44 fit plate.
6. Remove the two screws of ⓒ, and remove the DET-52 board from the DET44 fit plate.

7. Reinstall the DET-52 board by reversing the steps of removal.



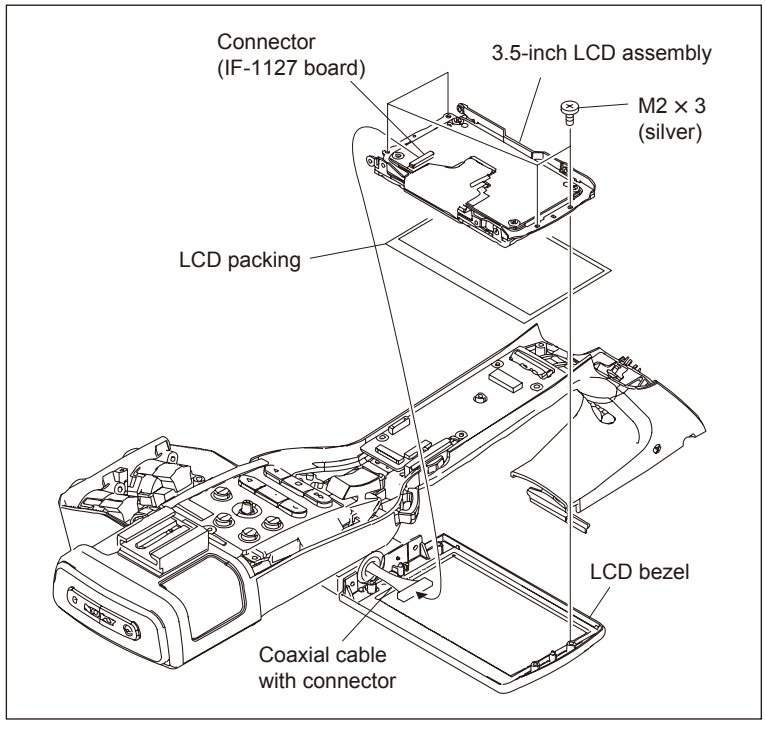
2-2-26. 3.5-inch LCD Assembly

1. Refer to Sections from 2-2-3 to 2-2-5 and disassemble the unit up to “Handle Assembly” removal.
2. Turn the LCD block in the direction of arrow “A”.
3. Remove the two screws and disengage the two claws, and remove the LCD cabinet in the direction of arrow “B”.



4. Disconnect the coaxial cable with connector from the IF-1127 board.
5. Remove the four screws and the LCD packing, and remove the 3.5-inch LCD assembly.

6. Reinstall the 3.5-inch LCD assembly by reversing the steps of removal.



2-2-27. Replacing the Parts in the Lens Grip

Removing the grip cover

1. Remove the three screws ⓐ, and remove the screw ⓑ. (Fig. 1)
2. Remove the grip cover in the direction of the arrow.(Fig. 1)
3. Disconnect the harness from the connector of the T/W zoom switch. (Fig. 2)

Replacing the cap (START/STOP)

1. Remove the cap (START/STOP) by pushing it in from the outside of the grip cover. (Fig. 3)
2. Install the new cap (START/STOP) by aligning its notch with the protrusion of the grip cover. (Fig. 3)

Installing the grip cover

Reinstall the grip cover by reversing the steps of removal.

Replacing the grip belt

1. Separate the grip belt from the buckle, and remove the pad. (Fig. 4)
2. Pull it off the grip belt from the grip cover. (Fig. 4)
3. Install the new grip belt by reversing the steps of removal. (Fig. 4)

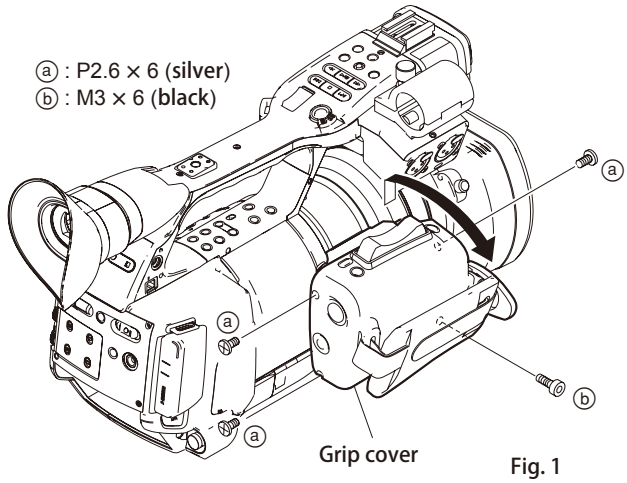


Fig. 1

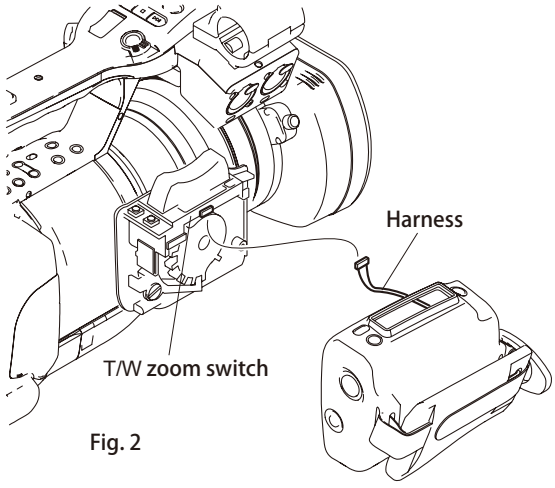


Fig. 2

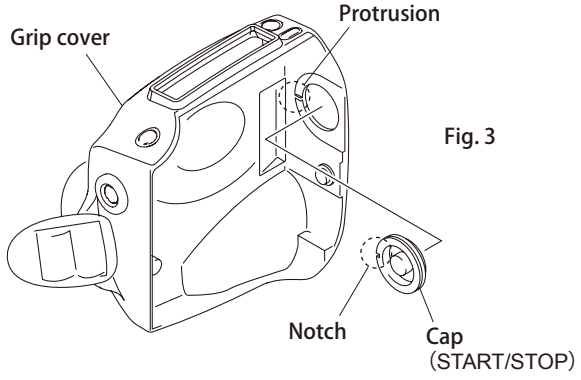


Fig. 3

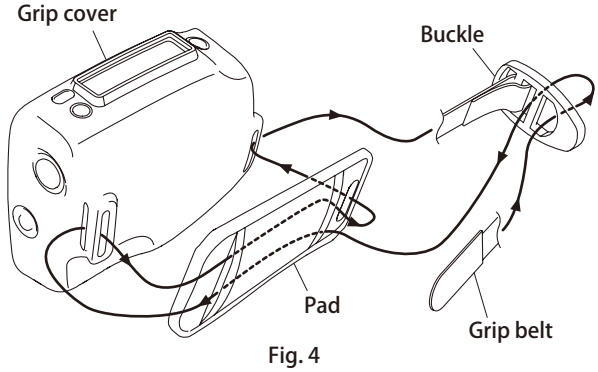


Fig. 4

Section 3
SERVICE Menu

3-1. Outline of SERVICE Menu

3-1-1. Basic Menu Operations

Basic Menu Operation

Press the MENU button to enter the menu mode. Press the PICTURE PROFILE button, the MENU button, or the STATUS button while the menu is displayed to close the menu display. The menu display is closed when the power is turned off.

1. Press the MENU button.
   - The system enters the menu mode.
   - For displaying the SERVICE menu, refer to section 3-1-3 of this manual.
2. Press the joystick to move the cursor to the desired setting item and press the SEL/SET button.

Exiting the Menu Mode

Press the MENU button again.
The system exits the menu mode to return to the normal camera mode.

3-1-2. SERVICE Menu Structure

The SERVICE menu consists of the three SERVICE dedicated menus and the six ordinary SETUP menus for a total of nine menus.

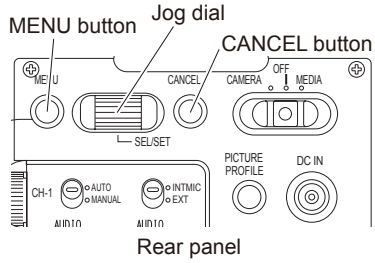
SERVICE menu types (SERVICE dedicated menus)

Menu name	Description
MAINTENANCE	Adjustment of parameters
RPN CORRECT	Operations regarding the RPN correction
INFORMATION	Information display on the particular PMW-EX1R and self-diagnostics

The MAINTENANCE menu and the RPN CORRECT menu can be operated in the CAMERA mode.

3-1-3. Displaying the SERVICE Menu

To display the SERVICE menu, the following operations are needed.
1. Close the LCD monitor.
2. Set the LCD B.LIGHT switch on the upper operation panel to the “OFF” position.
3. Set the GAIN switch on the side operation panel to the “H” position.
4. Press the CANCEL button, the MENU button, and the Jog dial at the same time.
5. When the LCD monitor is opened, the SERVICE menu is displayed.



Rear panel

- Pressing the MENU button again closes the SERVICE menu display.
- Once the SERVICE menu has been displayed, simply pressing the MENU button displays the SERVICE menu instead of the normal SETUP menu unless the power is turned off.

3-2. SERVICE Menu List

3-2-1. MAINTENANCE Menu

Menu Item	Submenu Item	Choice	Function
Test Saw	–	On Off	Turns On or Off the Test Saw
Auto BLK Balance	–	Execute Cancel	Starts up the auto black balance adjustment
Black Shading	Setting	On Off	Turns On or Off the black shading correction
	Channel Sel	G B R	Selects the channel (R-ch or G-ch or B-ch) to execute black shading adjustment on (The present setup values of H Saw, H Para, V Saw and V Para for the selected channel are displayed automatically)
	H Saw	–99 to +99	Adjusts the black shading H Saw correction level
	H Para	–99 to +99	Adjusts the black shading H Para correction level
	V Saw	–99 to +99	Adjusts the black shading V Saw correction level
	V Para	–99 to +99	Adjusts the black shading V Para correction level
	Auto BLK Shad	Execute Cancel	Starts up the auto black shading correction
White Shading	Setting	On Off	Turns On or Off the white shading correction
	Channel Sel	G B R	Selects the channel (R-ch or G-ch or B-ch) to execute white shading adjustment on (The present setup values of H Saw, H Para, V Saw and V Para of the selected channel are displayed automatically)
	H Saw	–99 to +99	Adjusts the white shading H Saw correction level
	H Para	–99 to +99	Adjusts the white shading H Para correction level
	V Saw	–99 to +99	Adjusts the white shading V Saw correction level
	V Para	–99 to +99	Adjusts the white shading V Para correction level
Flare	G Flare	–99 to +99	Adjusts the G-ch flare correction level
	B Flare	–99 to +99	Adjusts the B-ch flare correction level
	R Flare	–99 to +99	Adjusts the R-ch flare correction level

3-2-2. RPN CORRECT Menu

Menu Item	Submenu Item	Choice	Function
Auto Detection	–	Execute Cancel	Starts up automatic detection of RPN
Correction Mode	–	Concealment Compensation	Selects the RPN correction mode that is used to register or delete the manual registration
Channel	–	G B R	Selects and displays the channel (R-ch or G-ch or B-ch) to execute manual registration or deletion of RPN correction on
Cursor	–	On Off	Turns On or Off the RPN correction point indicator cursor
Cursor H Position	–	1 to 1920	Displays and move the horizontal address of the RPN correction point indicator cursor
Cursor V Position	–	1 to 1080	Displays and move the vertical address of the RPN correction point indicator cursor
Cursor Next	–	–	Moves the RPN correction point indicator cursor to the next RPN point
Cursor Prev	–	–	Moves the RPN correction point indicator cursor to the previous RPN point

Menu Item	Submenu Item	Choice	Function
Compensation Level	–	0 to 255	Indicates the RPN compensation level
Record	–	Execute Cancel	Registers the RPN
Delete	–	Execute Cancel	Deletes the RPN
Readout Mode	–	Field Frame	Selects the CMOS readout mode
Reset	–	Execute Cancel	Deletes all the RPN that are registered after shipment from the factory

3-2-3. INFORMATION Menu

Menu Item	Submenu Item	Choice	Function
Serial Number	–	–	Displays the serial number
Version	–	–	Displays the software version number
Self Diag	Diag Type	Type1 Type2	Selects the self-diagnostic type
	Item1	Execute Cancel	Executes self-diagnostic Item 1
	Item2	Execute Cancel	Executes self-diagnostic Item 2
	Item3	Execute Cancel	Executes self-diagnostic Item 3
	Item4	Execute Cancel	Executes self-diagnostic Item 4
	Item5	Execute Cancel	Executes self-diagnostic Item 5
	Item6	Execute Cancel	Executes self-diagnostic Item 6
	Item7	Execute Cancel	Executes self-diagnostic Item 7
	Item8	Execute Cancel	Executes self-diagnostic Item 8
	Item9	Execute Cancel	Executes self-diagnostic Item 9
	Item10	Execute Cancel	Executes self-diagnostic Item 10
	Item11	Execute Cancel	Executes self-diagnostic Item 11
	Item12	–	Do not execute this item.
	Item13	–	Do not execute this item.
Log Dump	–	Execute Cancel	Records the error log to media

3-3. Self-Diagnostic Function

Self Diag of INFORMATION menu enables the user to execute self-diagnosis of the equipment. When Self Diag is run, the result of self-diagnosis appears regardless of whether the result is good or bad.
The self-diagnosis can be executed only under the following conditions. When executing the self-diagnosis, change to the following conditions with the SHUTTER switch and the SETUP menu.

- SHUTTER switch: Off ← lower front of the unit
- EX Slow Shutter: Off ← CAMERA menu
- Country: NTSC Area ← OTHERS menu
- Video Format: HQ1080/60i ← OTHERS menu

1. Self-diagnostic items
   The following two types of self-diagnosis are provided.
   In addition, since the system cannot be returned to normal operations after the self-diagnosis, the power must be turned off and on again.
   - Type1: Simple self-diagnosis
     Use to execute a simple version of the self-diagnosis. This finishes in a short time.
   - Type2: Complete self-diagnosis
     This executes all items included in the Self Diag. Since complete self-diagnosis involves a memory test and a complicated device test, this requires time to be completed.

Self-diagnostic item list

Item No.	Self-diagnostic item	Description
Item1	Image processor block	Diagnosis of lens, CMOS block, and camera block
Item2	Display block	Diagnosis of video signal system (LCD and base band signal processing)
Item3	Media block	Diagnosis of media recording and playback (encoder, decoder, memory card, i.LINK and USB interface)
Item4	Audio block	Diagnosis of audio input and output
Item5	System controller block	Diagnosis of system controller system
Item6	Power block	Diagnosis of power supply system
Item7	I/F between image processor and display block	Diagnosis of the signal line from camera signal processor IC to base band processing IC
Item8	Video I/F while recording between display and media block	Diagnosis of the video signal line (recording direction) from base band processing IC via encoder IC to AVIT signal processing IC
Item9	Video I/F while playing back between display and media block	Diagnosis of the video signal line (playback direction) from AVIT signal processing IC via decoder IC to base band processing IC
Item10	Audio I/F while recording between display and media block	Diagnosis of the audio signal line (recording direction) from base band processing IC to AVIT signal processing IC
Item11	Audio I/F while playing back between display and media block	Diagnosis of the audio signal line (playback direction) from AVIT signal processing IC to base band processing IC
Item12	Do not execute this item.	
Item13	Do not execute this item.	

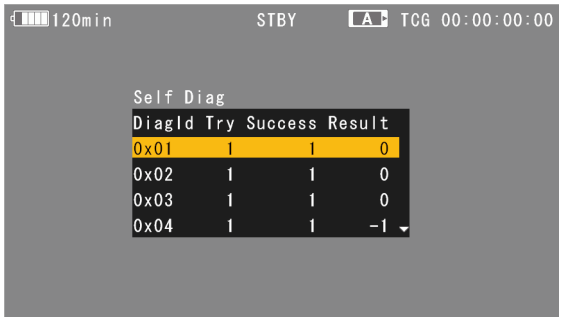
2. Procedure for the self-diagnosis
   (1) Select the type of self-diagnosis (Type 1 or Type 2) in Diag Type.

   Note

   When Type 1/2 for an Item in the table is “1 only”, the item executes only for type 1, and when it is “2 only”, it executes only for type 2. For “1, 2”, the item executes for both type 1 and type 2.

   (2) Select the Item of self-diagnosis from Item1 to Item11.
   (3) When an Item is selected, Execute and Cancel appear. In addition, when Execute is selected, the self-diagnosis of the selected Item starts.
   (4) When the self-diagnosis is completed, the result of self-diagnosis appears.

Example of the display for results of self-diagnosis



Press the CANCEL button, joystick, or jog dial while displaying the result of self-diagnosis to return to the INFORMATION menu.

The results of self-diagnosis
The result of self-diagnosis is composed of the diagnostic item ID (DiagID) for the Item and Try, Success, and Result for the item. The result of the self-diagnosis for each item is displayed after execution.

Meaning of Try, Success, and Result

Category	Description
Try	Shows the number of trials of the self-diagnosis.
Success	Shows the number of internal successes of the self-diagnosis.
Result	Shows the result of the self-diagnosis. “0” means no problems. When a value other than “0” is displayed, check the details for each self-diagnostic item.

3. Details of self-diagnosis
   This section describes self-diagnostic items included in each Item. The values in the Error value column show the value for errors. The value is “0” when there is no error.

Item1: Image processor block diagnosis

Image processor block diagnosis analyzes the following contents.

(Type 1 takes about 10 seconds, Type 2 takes about three minutes.)

ID	Diagnosis description	Error value	Type 1/2	Note
0x07	Lens driving check	-1: Error in iris, focus, zoom, or correction lens	2 only	SERVO/MANU switch of zoom must be set to “SERVO”. Each ring of zoom and iris automatically turns during the diagnosis. Therefore, make sure not to touch rings during the diagnosis. (The focus ring does not turn.)
0x08	Number of RPN registrations check	-1: Exceeding RPN max number	1, 2	–
0x09	Reading/Writing data test to CMOS block, video signal bus connection test between CMOS and camera signal processor IC	-1: CMOS Read/Write NG or CMOS video signal bus NG	1, 2	–
0x0a	Communication test of camera signal processor IC	-5: Camera signal processor IC Read/Write NG	1, 2	–

When an error is detected in the item, it indicates a possible error in the hardware.

Item2: Display block diagnosis

Display block diagnosis analyzes the following contents. (Ver.1.1 or later)

ID	Diagnosis description	Error value	Type 1/2	Note
0x01	Communication signal line test of LCD	-1: Connection error	1, 2	–
0x02	Communication signal line test of COPRO (SAD)	-1: Connection error	1, 2	–

Item3: Media block diagnosis

Media block diagnosis analyzes the following contents. There can be cases that the error value "−6" is displayed with any ID other than what are listed in the following table. The error value "−6" does not mean any abnormality in such cases.
Be sure to turn off the power once whenever the media block diagnosis item 3 is executed.

ID	Diagnosis description	Error value	Type 1/2	Note
0x01	DDR2 SDRAM Read/Write check	-1: Error	2 only	Continuous operations cannot be operated after this check. This check requires a long time.
0x06	USB Device Register Read/Write check	-1: Error	1 only	–
0x09	i.Link Register Read/ Write check	-1: Error	1 only	–
0x0B	USB Host Register Read/ Write check	-1: Error	1 only	–
0x14	PIFC POWSW	-1: Error	1 only	–
0x15	SPA POWSW	-1: Error	1 only	–
0x12	MPEG encoder/decoder IC Data Read/Write	-1: Error	1 only	–
0x20	NOR-FlashROM data consistency check	-1: Error	1 only	–
0x23	Slot A LED blink	-1: Error	1 only	–
0x24	Slot B LED blink	-1: Error	1 only	–

Item4: Audio block diagnosis

Audio block diagnosis analyzes the following contents.

ID	Diagnosis description	Error value	Type 1/2	Note
0x02	Memory area check for audio block	-1: Memory read/write comparison NG	1, 2	–

When an error occurs, it indicates that the hardware has a defect.

Item5: System controller block diagnosis

System controller block diagnosis analyzes the following contents.

ID	Diagnosis description	Error value	Type 1/2	Note
0x01	IIC communication test (clock IC)	-1: Error	1, 2	–
0x02	IIC communication test (EEPROM)	-1: Error	1, 2	–
0x03	IIC communication test (power supply microcomputer)	-1: Error	1, 2	–
0x04	IIC communication test (sub-microcomputer of the inside panel)	-1: Error	1, 2	–
0x05	IIC communication test (sub-microcomputer of the handle)	-1: Error	1, 2	–
0x06	IIC communication test (sub-microcomputer of the rear panel)	-1: Error	1, 2	–
0x09	IIC communication test (I/O expander)	-1: Error	1, 2	–
0x10	Version matching test (power supply microcomputer)	-1: Error	1, 2	∗
0x11	Version matching test (sub-microcomputer of the inside panel)	-1: Error	1, 2	∗
0x12	Version matching test (sub-microcomputer of the handle)	-1: Error	1, 2	∗
0x13	Version matching test (sub-microcomputer of the rear panel)	-1: Error	1, 2	∗

When an error is detected in the IIC communication test, it indicates a possible failure in the communication line or device.

∗: When an error is detected in the version matching test, upgrade again to a compatible version.
Contact your local Sony Sales Office/Service Center for information on versions.

Item6: Power block diagnosis

Power block diagnosis analyzes the following contents.

ID	Diagnosis description	Error value	Type 1/2	Note
0x01	Power switch readout	-1: Cannot readout power switch -4: Cannot diagnose since the power switch is not set to CAMERA	1, 2	Power switch must be set to CAMERA
0x02	Battery recognition	-1: Cannot communicate with battery -4: Cannot diagnose since the battery is not connected	1, 2	Appropriate battery must be connected
0x03	Power supply state	-1: Power supply is not controlled correctly -4: Cannot diagnose since the power switch is not CAMERA	1, 2	Power switch must be set to CAMERA

Item7: Diagnosis between image processor and display blocks

Diagnosis between Image processor and Display blocks analyzes the following contents.

ID	Diagnosis description	Error value	Type 1/2	Note
0x80	Video signal line test	-1: Test pattern checking failure	1, 2	Conducts a test from camera signal processor IC to base band processing IC. Monitor output images will be distorted during the test.

When an error is detected, it indicates a possible failure in the chip or the signal line between chips.

Item8 to 11: Diagnosis between display and media blocks

Diagnosis between display and media blocks analyzes the following contents.

Item No.	ID	Diagnosis description	Error value	Type 1/2	Note
8	0x90	Video signal line communication test in recording direction (in the direction from base band processing IC to AVIT signal processing IC)	-1: Test pattern checking failure -2: Sequence error	1, 2	–
9	0x91	Video signal line communication test in playback direction (in the direction from AVIT signal processing IC to base band processing IC)	-1: Test pattern checking failure -2: Sequence error	1, 2	–
10	0x92	LPCM signal line communication test in recording direction (in the direction from base band processing IC to AVIT signal processing IC)	-1: Test pattern checking failure -2: Sequence error	1, 2	–
11	0x93	LPCM signal line communication test in playback direction (in the direction from AVIT signal processing IC to base band processing IC)	-1: Test pattern checking failure -2: Sequence error	1, 2	–

• When an error is detected, it indicates a possible failure in the chip or the signal line between chips.

Note

Do not execute item12, 13.

3-4. Executing Log Dump

Executing Log Dump acquires the error log information and saves it to the active, writable media.
Select Log Dump under the INFORMATION menu, and execute it with Execute. The process is complete when “Log Dump Done” is displayed as a result.

Note

Do not remove the media until Log Dump message appears.

3-5. List of Error Numbers on the LCD Display

This unit has a self diagnosis function to check internal errors.
When the unit detects an error, the error number is displayed on the LCD monitor and EVF display, and operation is stopped.
Error numbers are displayed as E-XXXXX (X indicates a number).

Error No.	Description	Service action
15030	System error	Repair the DPR-311 board or replace it.
17001	Abnormality in the Media ID data in the EEPROM	Rewrite the media ID data in the EEPROM using “ServiceNavi-EX”.
17002	The image processor block does not start up	Repair the DPR-311 board or replace it.
17003	The display block does not start up	
17004	The media block does not start up	
17005	Abnormality in the start-up process of the image processor block	
17006	Abnormality in the start-up process of the display block	
17007	Abnormality in the start-up process of the media block	
17014	Abnormality in lens communication	Check the connection with the lens unit. If there is no defect, replace the lens unit.
17015	Abnormality in the media block	Repair the DPR-311 or replace it.
17016	Abnormality in obtaining the lens switch	Check the connection with the lens unit. If there is no condition defect, replace the lens unit.
17017 or 4XXXX	Internal error in the media block	Repair the DPR-311 board or replace it.

If multiple errors occur simultaneously

The highest-priority error is displayed.
When an error with a higher priority is cleared, the one with the next priority is displayed.

Section 4
Alignment

4-1. Servicing software “ServiceNavi-EX”

Servicing software “ServiceNavi-EX” is required for electrical adjustment and self diagnosis.
For how to obtain the “ServiceNavi-EX”, contact your local Sony Sales Office/Service Center.

4-2. Preparation

Notes

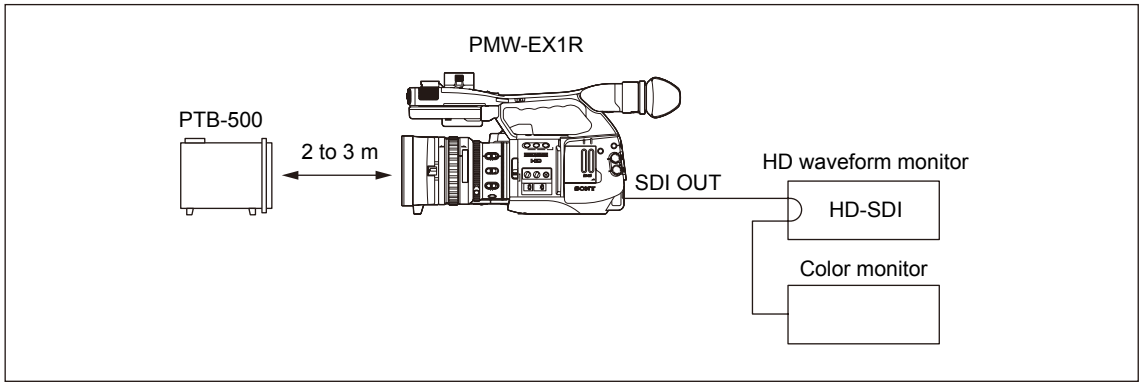
- When adjusting the PMW-EX1R, use the AC adapter or a fully-charged battery pack.
- When disconnecting the AC adapter or battery pack after the adjustment, turn off the power switch and wait for at least 10 seconds.

4-2-1. Service Tools and Equipment

Refer to Section 1-4 for detail of the service tools and equipment used for the adjustments.

4-2-2. Connection

Connect an HD waveform monitor to the SDI OUT terminal of the unit.



4-3. MAINTENANCE Menu

The MAINTENANCE menu enables setting for image device and setting parameters that must be set uniquely to each PMW-EX1R for correction of non-uniformity between the respective lens characteristics.

4-3-1. Test Saw Setting

- Test Saw setting enables the operator to select the Test Saw signal instead of the imager output signal when recording or outputting images in CAMERA mode.

4-3-2. Executing Auto Black Balance

- Executing the Auto Black Balance triggers the auto black balance adjustment (automatic black level adjustment).
- When the Auto Black Balance menu is selected, the Execute and Cancel choices appear. In addition, selecting Execute starts Auto Black Balance.
- When the Auto Black Balance is executed, the execute RPN automatic detection.

Note

Auto Black Balance cannot be executed from the SERVICE menu under the following settings. Change the settings to execute Auto Black Balance.

- When Video Format other than HQ 1080/60i or HQ 1080/50i is selected.
- When electronic shutter is operating in the SLS mode.
- When the EX Slow Shutter is set to ON.

4-3-3. Black Shading Adjustment

The Black Shading menu enables the H Saw correction level adjustment, V Saw correction level adjustment and parabola correction level adjustment.

Note

All of the Black Shading correction values have been set to ±0 when shipped from the factory. (When the Black Shading correction is executed, it results in height difference of black level at the boundary areas between the corrected areas). Do not change the Black Shading correction values to any values other than ±0 unless it is necessary.

1. Setting

The Black Shading setting menu can be used to turn Black Shading correction On or Off.
The Black Shading correction is turned On automatically when the power is turned On.

2. Channel Select

- The Channel Select menu enables selection of the channel (G-ch or B-ch or R-ch) to execute the H Saw, H Para, V Saw, and V Para black shading adjustments on.
- When the Channel Select menu selects any other channel, the displays of the H Saw, H Para, V Saw, and V Para setup values are changed to the current setup values of the channel selected by the Channel Select menu. The changes are reflected on the H Saw, H Para, V Saw, and V Para setup values.

H Saw

The H Saw menu enables the horizontal Saw black shading correction (linear increase and decrease) level.

H Para

The H Para menu enables the horizontal Parabola black shading correction (black level correction at the horizontal center with respect to both ends) level.

V Saw

The V Saw menu enables the vertical Saw black shading correction (linear increase and decrease) level.

V Para

The V Para menu enables the vertical Parabola black shading correction (black level correction at the vertical center with respect to both ends) level.

3. Auto BLK Shad

- The Auto BLK Shad menu enables the auto black shading correction (automatic optimization of the respective correction values of the black shading correction).
- When Auto BLK Shad menu is selected, the Execute and Cancel choices appear.
  In addition, selecting Execute starts Auto Black Shading.

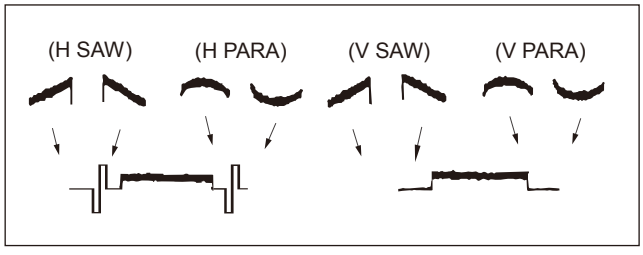
Black shading adjustment method

Preparation

- Connect an HD waveform monitor to the SDI OUT terminal.
- HD waveform monitor setting → RGB mode
- Lens iris → CLOSE

Adjustment Procedure

1. Adjust GAIN and BLK level for easy viewing to observe.
2. Adjust H Saw, H Para, V Saw and V Para for the respective channels of G-ch, B-ch and R-ch until waveform on the waveform monitor becomes flat.



4-3-4. White Shading Adjustment

The White Shading menu enables the adjustment of the horizontal and vertical Saw correction level and parabola correction level.

Notes

- The White Shading adjustment cannot be executed for the correct adjustment values if the object pattern has non-uniformity or if other conditions such as lens iris setting and zoom setting are not correctly satisfied.
- Use a full white pattern for the White Shading adjustment having uniform brightness over the entire area.
- If a full white pattern having uniform brightness over the entire area is not available, do not execute the G-channel White Balance adjustment. Instead of it, execute the White Balance adjustment in the way of aligning the R-channel waveform and the B-channel waveform to the waveform of G-channel.

1. Setting

The White Shading setting menu can be used to turn White Shading correction On or Off.
The White Shading correction is turned On automatically when the power is turned On.

2. Channel Select

- The Channel Select menu enables selection of the channel (G-ch or B-ch or R-ch) to execute the H Saw, H Para, V Saw, and V Para white shading adjustments on.

• When the Channel Select menu selects any other channel, the displays of the H Saw, H Para, V Saw, and V Para setup values are changed to the current setup values of the channel selected by the Channel Select menu. The changes are reflected on the H Saw, H Para, V Saw, and V Para setup values.

H Saw

The H Saw menu enables the horizontal Saw white shading correction (linear increase and decrease) level.

H Para

The H Para menu enables the horizontal Parabola white shading correction (sensitivity correction at the horizontal center with respect to both ends) level.

V Saw

The V Saw menu enables the vertical Saw black shading correction (linear increase and decrease) level.

V Para

The V Para menu enables the vertical Parabola white shading correction (sensitivity correction at the vertical center with respect to both ends) level.

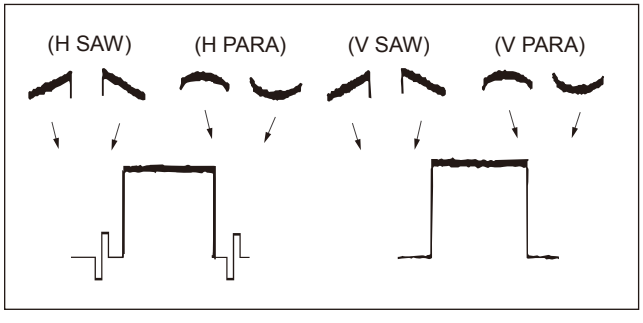
White shading adjustment method

Preparation

- Connect an HD waveform monitor to the SDI OUT terminal.
- HD waveform monitor setting → RGB mode
- Focus → ∞
- Shoot an all white pattern over the entire frame of monitor screen.

Adjustment Procedure

1. Adjust lens iris until white level becomes approximately 80%.
   If the lens iris value is larger than F5.6, adjust the incoming light intensity by using electronic shutter for the lens iris setting of smaller than F5.6.
2. Adjust H Saw, H Para, V Saw and V Para for the respective channels of G-ch, B-ch and R-ch until waveform on the waveform monitor becomes flat.



4-3-5. Flare Adjustment

The Flare Adjustment menu enables flare compensation for the respective channels of G-channel, B-channel and R-channel.

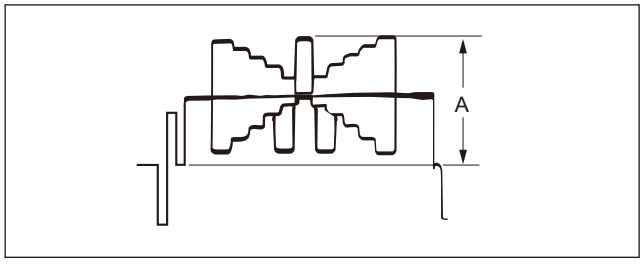
Flare adjustment method

Preparation

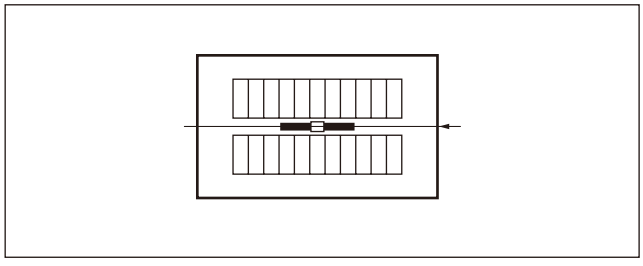
- Connect an HD waveform monitor to the SDI OUT terminal.
- HD waveform monitor setting → RGB mode
- Shoot a gray-scale chart to fill the entire screen of the picture frame and execute the white balance.
- Set the Knee to the Auto or Off.

Adjustment Procedure

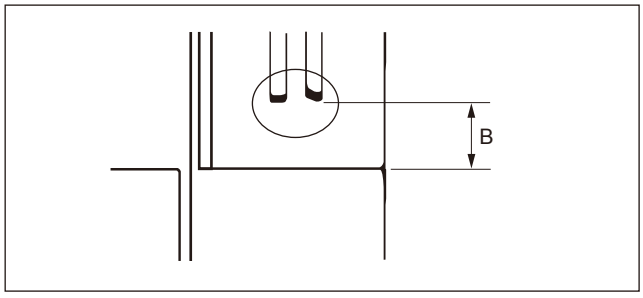
1. Adjust lens iris until white level becomes approximately 100%. After that, open the lens iris by two stops.



2. Select waveform of the signal at the center of grayscale signal on a waveform monitor.



3. Adjust R Flare, G Flare and B Flare until the black levels on both sides of the center white in all of the R, G and B channels to a unity level. (Align black level all channels to that of the channel having the lowest black level.)



Notes

- The flare adjustment can be performed only when there is a correct grayscale chart.
- When there is no correct grayscale chart, adjust the values of R Flare, G Flare and B Flare to ±0.

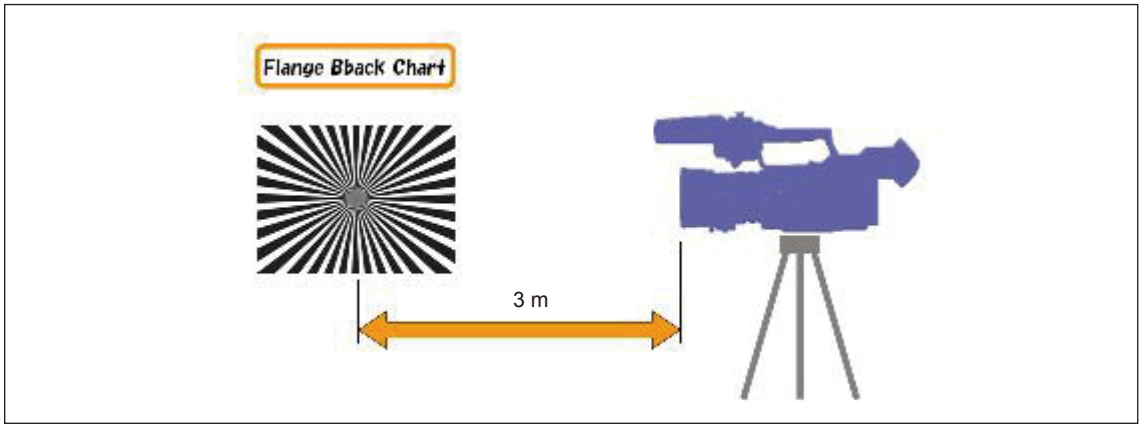
4-3-6. Executing Auto FB Adjust

- Executing the Auto FB Adjust menu enables automatic adjustment of lens flange back.
- When Auto FB Adjust (Flange Focal Length automatic adjustment) starts, the Flange Focal Length of a lens is adjusted until automatic focusing is established at the WIDE end and TELE end of a zoom lens. This allows a lens to remain in focus even though the zoom position is changed after focus adjustment. The result of Auto FB Adjust is saved.
- When the Auto FB Adjust menu is selected, the Execute and Cancel choices appear. In addition, selecting Execute starts automatic adjustment of flange back.

FB (Flange Focal Length) adjustment method

Preparation

- Upgrade the firmware to the newest version.
- Prepare the Flange Back Chart and place it at the distance of 3 meters far from the camera.

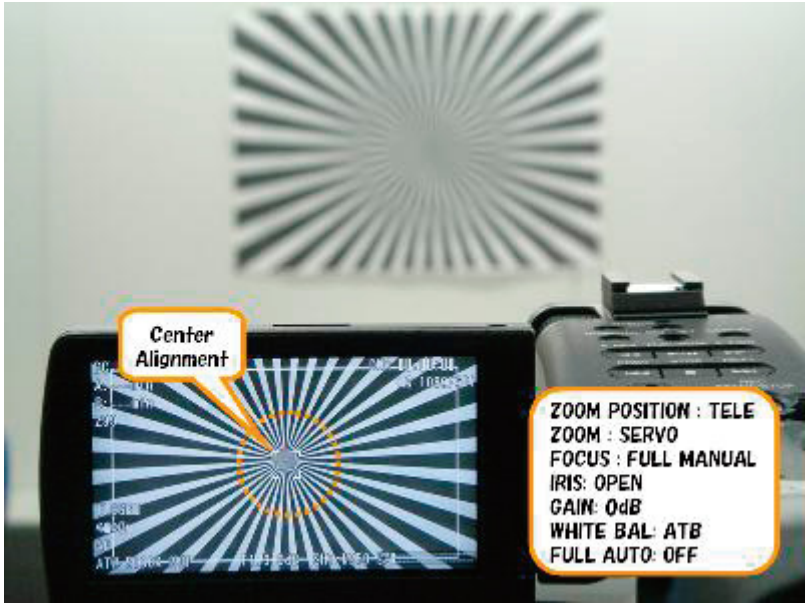


- Set up the camera as follows:

Item	Setting
FOCUS RING	FULL MF
IRIS SW	MANUAL
MACRO SW	OFF
FOCUS SW	MANUAL
ZOOM SW	SERVO
ND FILTER	OFF (Clear)
SHUTTER SW	ON
GAIN	L (0 dB)
WHITE BAL	B (ATW)
FULL AUTO	OFF

Adjustment Procedure

1. Set the Video Format by selecting the menus as follows:
   [OTHERS] → [Video Format] → Select either [HQ 1080/60i] or [HQ 1080/50i].
2. Set the lens iris to OPEN, and set the shutter speed as follows to match the adjustment environment.
   Select menus in order: [CAMERA SET] → [Shutter] → [Mode] → [Speed].
   Next, select menus in order: [CAMERA SET] → [Shutter] → [Speed] and select an appropriate shutter speed.
3. Set the ZOOM to TELE end, and adjust the camera position so that center of the chart stays approximately in the center of a screen.



Item	Setting	Lens
ZOOM POSITION	–	TELE
ZOOM	SERVO	–
FOCUS	–	FULL MANUAL
IRIS	–	OPEN
GAIN	0dB	–
WHITE BAL	ATB	–
FULL AUTO	OFF	–

4. Enter the SERVICE menu and select [MAINTENANCE] → [Auto FB Adjust]. Then, execute Auto FB Adjust.
5. Wait until Auto FB Adjust is complete.
6. Restart the camera.

Check after Adjustment

1. Set the lens iris to OPEN, set the ZOOM to TELE end and adjust the focus.
2. Move ZOOM from TELE end to WIDE end, and check that the lens remains in focus throughout the travel between TELE end and WIDE end.

4-4. RPN CORRECT Menu

The RPN CORRECT menu enables various operations such as manual registration, deletion and automatic detection of the RPN compensation point.

4-4-1. Executing Auto Detection

- The Auto Detection menu enables automatic detection of RPN point.
- When the Auto Detection menu is selected, the Execute and Cancel choices appear.
  In addition, selecting Execute starts RPN Auto Detection.
- The RPN point that is detected by the Auto Detection is added to the RPN correction point.

Note

Auto Detection cannot be executed under the following settings.
Change the settings to execute Auto Detection.

- When Video Format other than HQ 1080/60i or HQ 1080/50i is selected.
- When electronic shutter is operating in the SLS mode.
- When the EX Slow Shutter is set to ON.

4-4-2. Correction Mode Settings

- The Correction Mode menu enables selection of the RPN correction mode for a pixel when the pixel is registered by manual registration of RPN.
- The Correction Mode selecting Concealment and Compensation.
- For the manual registration of RPN, select Concealment.

4-4-3. Channel Setting

- The Channel menu enables selection of the channel (R-ch or G-ch or B-ch) to execute Record of RPN pixel on, in the manual registration of RPN.
- When the RPN cursor (indicating location of an RPN pixel to register) is moved to an already-registered RPN correction point by the Cursor Next or Cursor Prev operation, the correction mode selected for the RPN point is displayed automatically.

4-4-4. Cursor Setting

- The Cursor menu enables turning On or Off the crosshair cursor display indicating the RPN correction position in the manual registration of RPN.
- When the Cursor menu is turned On, the crosshair cursor indicating the RPN correction position is displayed superimposed on the video signal.
- Signal of the pixel located at the center of the crosshair cursor is replaced by black.
- The Cursor setting is always turned Off when the power is turned On.

4-4-5. Cursor H Position Setting

- The Cursor H Position menu enables the user to change the horizontal position of the RPN point within the effective period of video signal in the manual registration of RPN.
- When the RPN cursor (indicating the location of a RPN pixel to register) is moved to an already-registered RPN correction point by the Cursor Next or Cursor Prev operation, the display automatically switches to the numeric value of the horizontal position of the RPN point.

4-4-6. Cursor V Position Setting

- The Cursor V Position menu enables the user to change the vertical position of the RPN point within the effective period of video signal in the manual registration of RPN.
- When the RPN cursor (indicating the location of a RPN pixel to register) is moved to an already-registered RPN correction point by the Cursor Next or Cursor Prev operation, the display automatically switches to the numeric value of the vertical position of the RPN point.

4-4-7. Operating Cursor Next

- The Cursor Next menu enables the user to move the RPN cursor position to the next already-registered RPN correction point after the present position in the ascending order of the addresses during the manual registration of RPN. (If multiple RPN positions have the same address in the ascending order of the Cursor V Position, the RPN cursor moves in the ascending order of the Cursor H Position.)

4-4-8. Operating Cursor Prev

- The Cursor Prev menu enables the user to move the RPN cursor position to the next already-registered RPN correction point after the present position in the descending order of the addresses during the manual registration of RPN. (If multiple RPN positions have the same address in the descending order of the Cursor V Position, the RPN cursor moves in the descending order of the Cursor H Position.)

4-4-9. Compensation Level Display

- The Compensation Level menu indicates the compensation level of the already-registered RPN correction point when the crosshair cursor is moved to a correction point by the Cursor Next or Cursor Prev operation, and if the compensation mode of the already-registered point is Compensation.
- The Compensation Level menu is dedicated to display only and the cursor cannot be moved to this menu.

4-4-10. Executing Record

- The Record menu enables the manual registration of RPN.
- When Record menu is selected, the Execute and Cancel choices appear.
  In addition, selecting Execute starts the registration of RPN.

4-4-11. Executing Delete

- The Delete menu enables manual deletion of RPN.
- When the Delete menu is executed, the RPN registration of a pixel at an address specified by the Cursor H Position and Cursor V Position is deleted from RPN data.
- When the Delete menu is selected, the Execute and Cancel choices appear.
  In addition, selecting Execute starts deletion of RPN.

4-4-12. Readout Mode Setting

- The Readout Mode menu enables the user to select the Frame readout mode of the imager in order to facilitate viewing the RPN position on a monitor screen.
- The Readout Mode setting is always set to Field when the power is turned On.

4-4-13. Executing Reset

- The Reset menu enables the user to delete the RPN correction point data that is registered by Auto Detection and Auto Black Balance after the equipment is shipped from the factory.
- The RPN data that is registered at the factory and the RPN data is manually registered cannot be deleted by the Reset.
- When the Reset menu is selected, the Execute and Cancel choices appear.
  In addition, selecting Execute starts reset of RPN.

RPN manual registration procedure

1. Set the Video Format to HQ 1080/60i.
2. Set the Readout Mode to Frame.
   (To facilitate viewing the RPN position on a monitor screen.)
3. Set the lens iris to CLOSE.
4. Adjust GAIN and Black Level to the settings that facilitate viewing the RPN position on a monitor screen.
5. Set Channel to the RPN color that is going to be registered.
6. Set Cursor to On.
7. Move the crosshair cursor to the RPN that is going to be registered by using Cursor H Position and Cursor V Position.
   (When the crosshair cursor is moved on top of the desired RPN, the RPN becomes invisible.)
8. Set Correction Mode to Concealment.
9. Execute the Record.

∗ When RPN Record is attempted, if the RPN registration of a pixel fails at a specific address due to a problem with the small interval between the current and previous registered RPN spots, the screen shows the message “NG : Adjacent Pixel”.

Section 5
Spare Parts

5-1. Notes on Repair Parts

1. Safety Related Components Warning

WARNING

Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

2. Standardization of Parts

Some repair parts supplied by Sony differ from those used for the unit. These are because of parts commonality and improvement.

3. Stock of Parts

Parts marked with “o” at SP (Supply Code) column of the spare parts list may not be stocked. Therefore, the delivery date will be delayed.

4. Harness

Harnesses with no part number are not registered as spare parts.

5-1. 補修部品注意事項

1. 安全重要部品

⚠警告

⚠印のついた部品は安全性を維持するために重要な部品です。したがって，交換する時は必ず指定の部品を使ってください。

2. 部品の共通化

ソニーから供給する補修用部品は，セットに使われているものと異なることがあります。
これは部品の共通化，改良等によるものです。

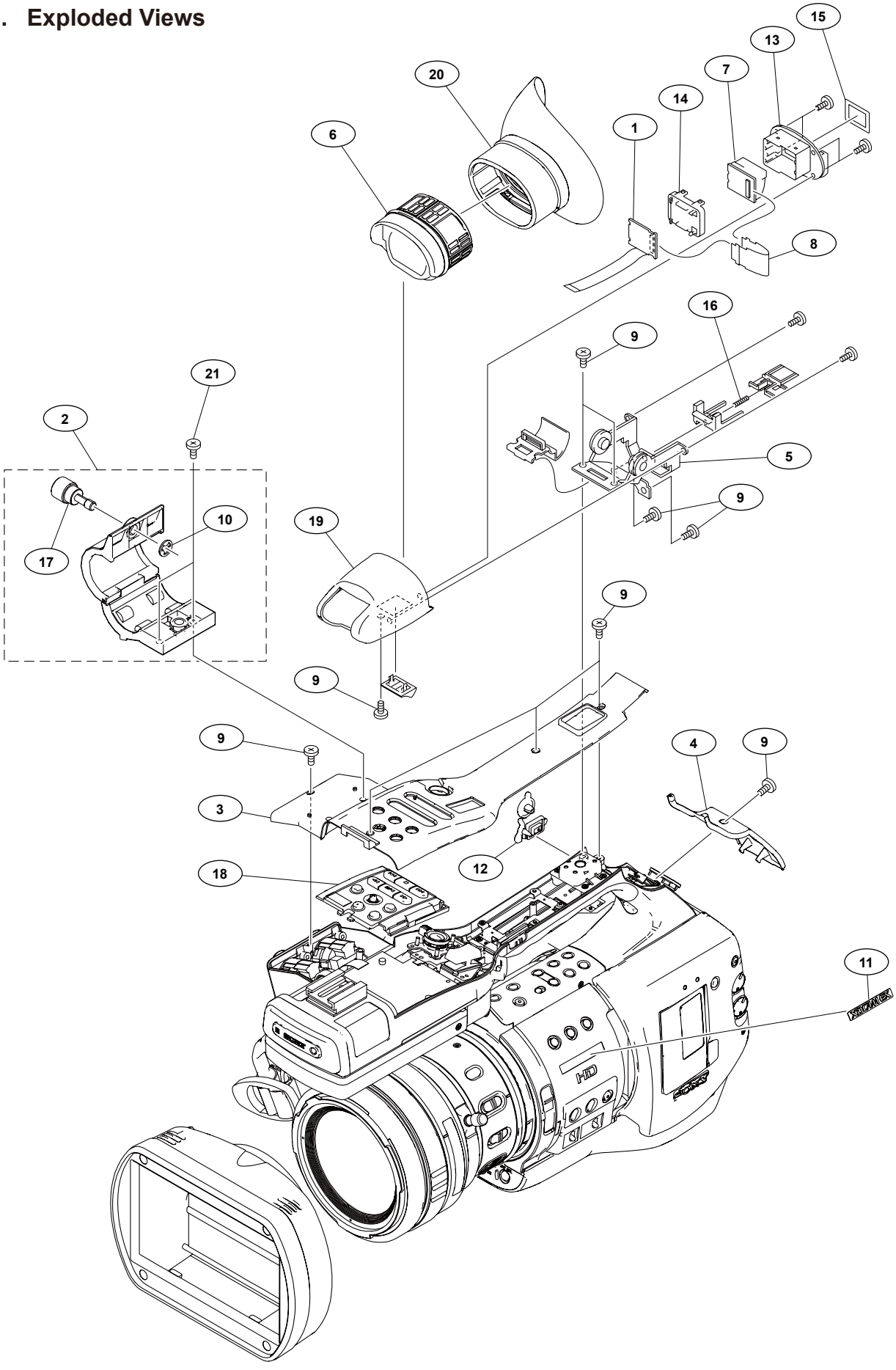
3. 部品の在庫

部品表の SP（Supply code）欄に “o” で示される部品は在庫していないことがあり，納期が長くなることがあります。

4. ハーネス

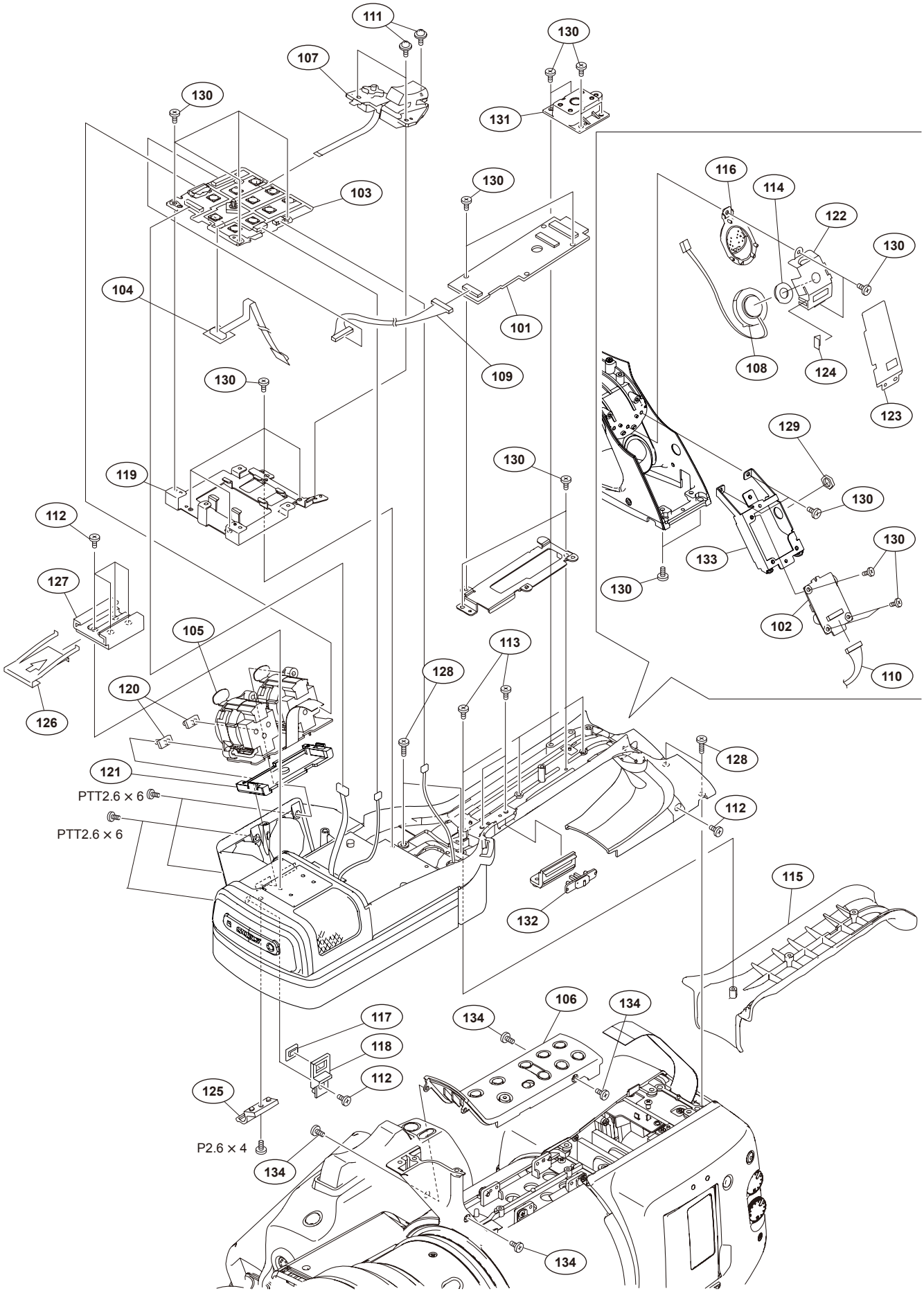
部品番号の記載されていないハーネスは，サービス部品として登録されていません。

5-2. Exploded Views



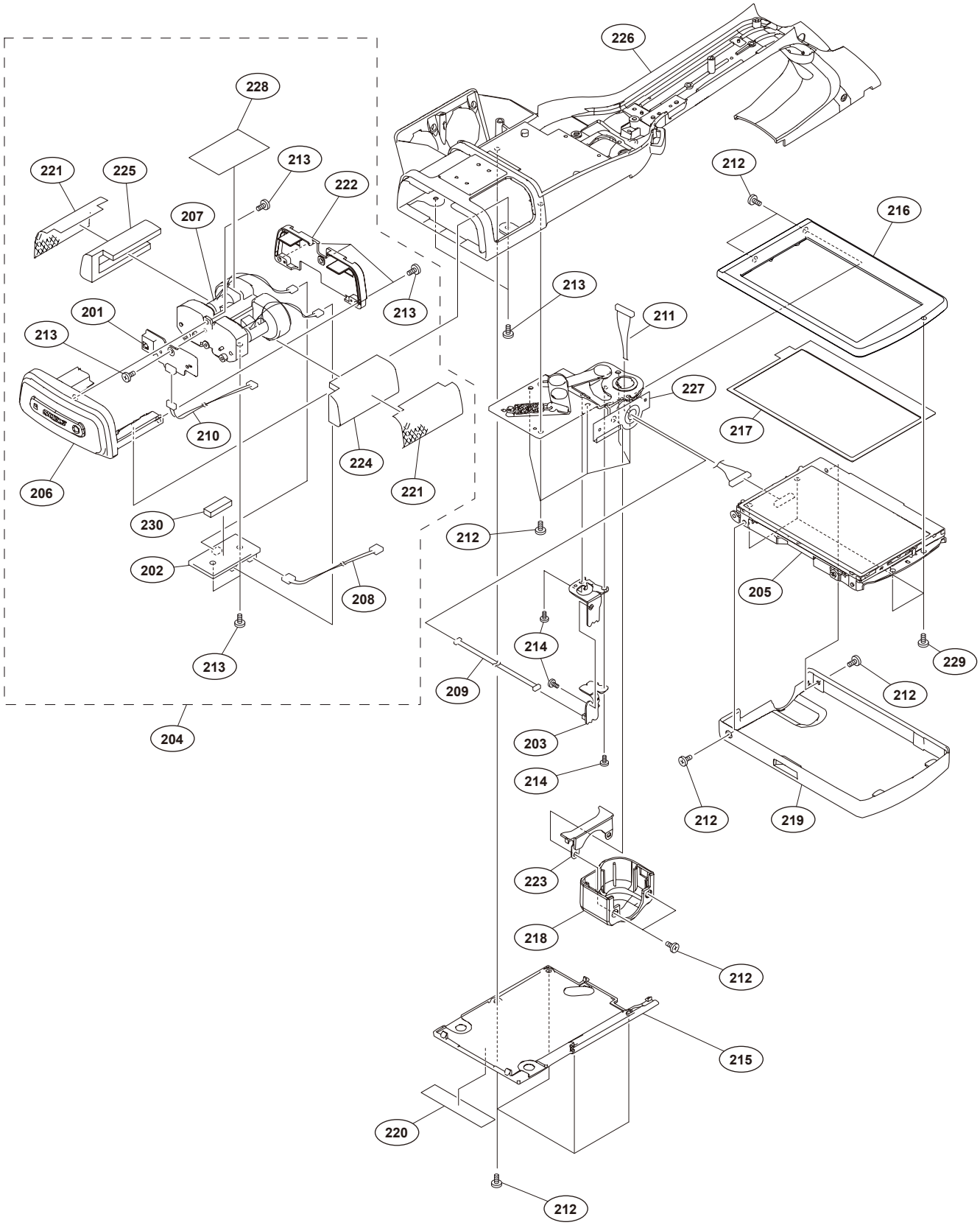
No.	Part No.	SP	Description
1	A-1737-582-A	s	MOUNTED CIRCUIT BOARD, HN-363
2	X-2187-352-2	s	MICROPHONE HOLDER ASSY
3	X-2515-725-1	s	ASSY HANDLE COVER UPPER
4	X-2515-727-1	s	COVER REAR ASSY HANDLE
5	X-2515-729-1	s	HINGE ASSY
6	X-2515-730-1	s	LOUPE ASSY
7	1-811-033-11	s	LCD MODULE
8	1-873-733-11	s	BOARD, FP-776 FLEXIBLE
9	3-080-203-31	s	SREW(M2),LOCK ACE,P2
10	3-165-904-01	s	WASHER, SCREW STOPPER
11	3-278-644-01	s	XDCAM EMBLEM
12	3-285-383-03	s	COVER CONNECTOR
13	3-288-585-02	s	CASE, PANEL
14	3-288-586-02	s	LID, PANEL
15	3-288-591-01	s	SHEET, VF PROTECTION
16	3-302-492-01	s	SPRING, COMPRESSION
17	3-657-657-02	s	SCREW (M5)
18	3-878-256-03	s	RUBBER SW KEY
19	4-164-591-01	s	CABINET EVF
20	4-164-856-01	s	EYE CUP
21	4-673-655-01	s	SCREW +B

Handle Block 1



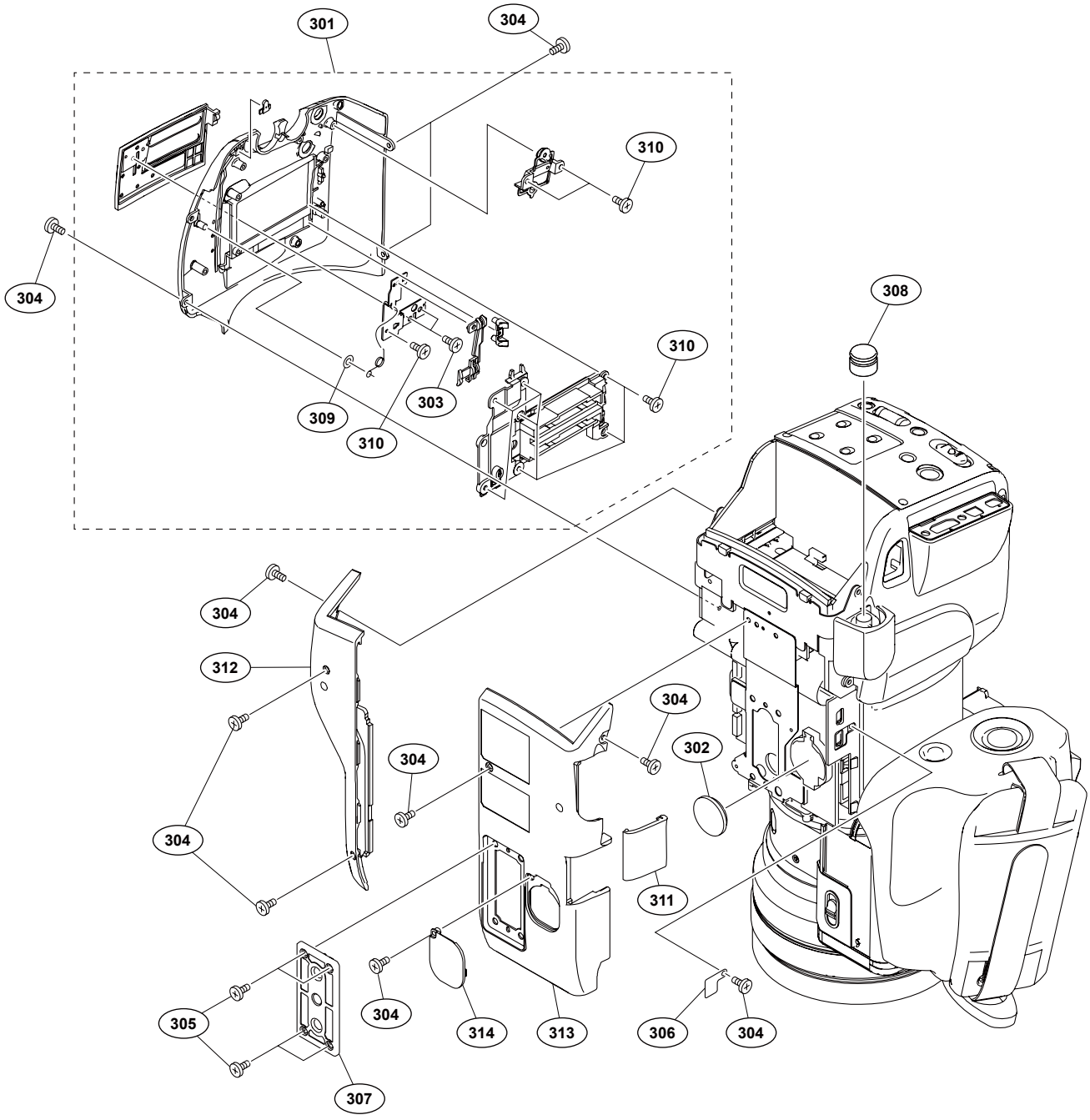
No.	Part No.	SP	Description
101	A-1737-622-A	s	MOUNTED CIRCUIT BOARD, DR-644
102	A-1737-623-A	s	MOUNTED CIRCUIT BOARD, LED-491
103	A-1737-624-A	s	MOUNTED CIRCUIT BOARD, KSW-55
104	A-1737-626-A	s	MOUNTED CIRCUIT BOARD, HN-361
105	A-1737-628-A	s	MOUNTED CIRCUIT BOARD, AXM-42
106	X-2515-751-1	s	COVER (CENTER) ASSY
107	1-478-955-21	s	SWITCH BLOCK, CONTROL(ZS-5610)
108	1-825-968-11	s	LOUDSPEAKER (1.8CM)
109	1-965-718-12	s	HARNESS, SUB (KSW53-DR621)
110	1-966-993-11	s	HARNESS, SUB (ASW68-LED491)
111	2-640-315-02	o	SCREW (M2X5), SMALL, +P, SW
112	3-080-203-31	s	SREW(M2),LOCK ACE,P2
113	3-080-206-21	s	SCREW, TAPPING, P2
114	3-276-443-01	s	SPEAKER CUSHION
115	3-276-875-03	s	HANDLE COVER LOW
116	3-276-876-01	s	SPEAKER GRILLE
117	3-276-877-01	s	DAMPER LCD
118	3-276-881-01	s	LCD SUPPORT
119	3-278-663-02	s	KSW-53 BRACKET
120	3-278-665-02	s	KNOB, XLR SW
121	3-278-666-02	s	RAIL, XLR SW
122	3-278-667-03	s	HOLDER,SPEAKER
123	3-282-659-02	s	SHEET,HANDLE REAR
124	3-452-727-01	s	SHEET, SPEAKER HOLDER
125	3-678-684-01	o	HOLDER, CABLE
126	3-688-754-11	s	SPRING
127	3-688-755-13	s	SHOE, ACCESSORY
128	3-694-181-03	s	TYPE1,AROCK PRECISION +P2.6X5
129	3-724-182-01	s	NUT (SMALL JACK), M6
130	3-968-729-52	s	SCREW (M2), LOCK ACE, P2
131	4-164-569-01	s	SHOE REAR ACCESSORY
132	4-164-593-02	s	SWITCH ZOOM
133	4-164-596-01	s	LED-491 BRACKET
134	3-080-203-01	s	SCREW (M2), LOCK ACE, P2
	7-627-556-38	s	SCREW +P 2.6X4.0
	7-685-792-09	s	SCREW +PTT 2.6X6 (S)

Handle Block 2



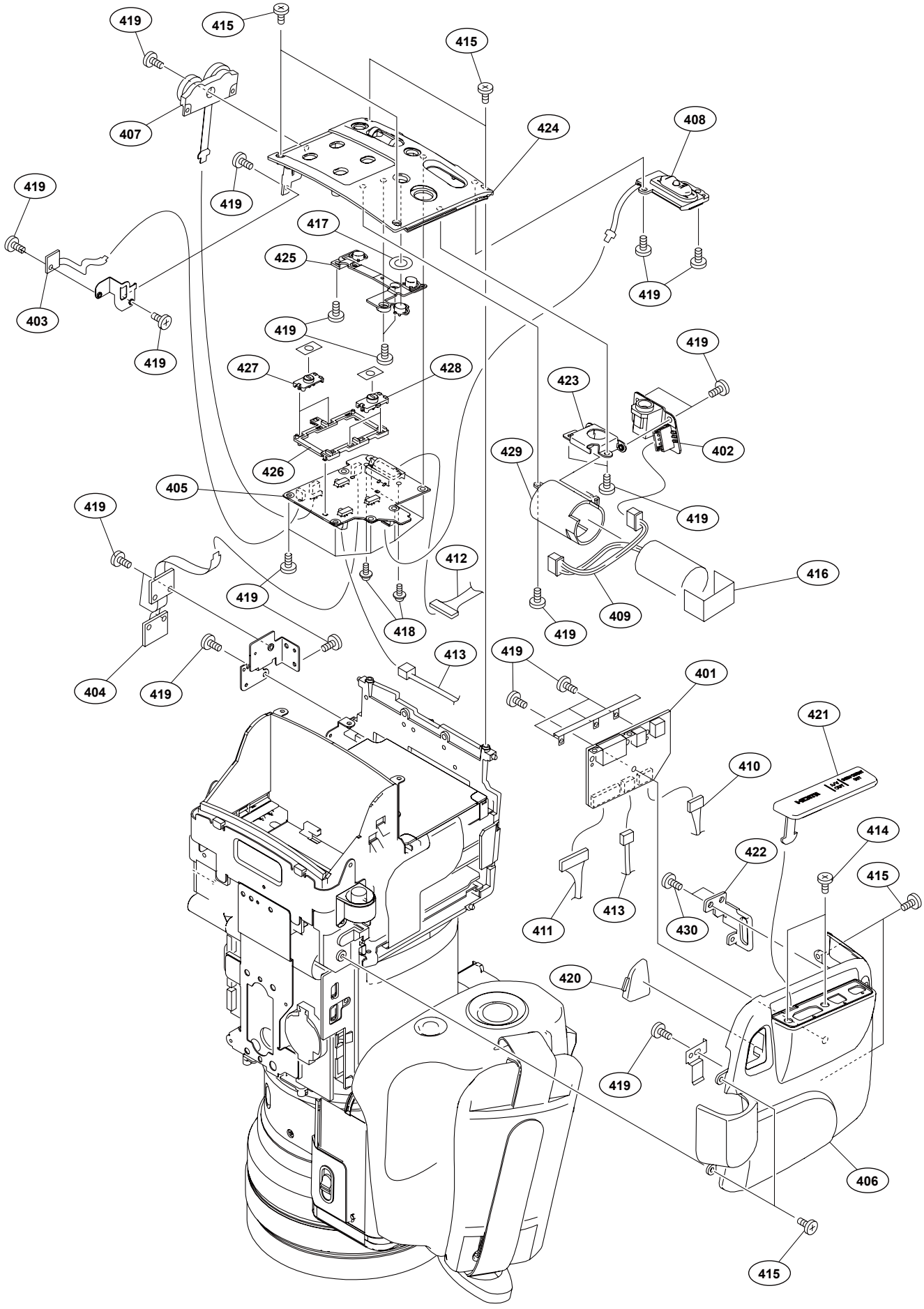
No.	Part No.	SP	Description
201	A-1737-619-A	s	MOUNTED CIRCUIT BOARD, RM-224
202	A-1737-620-A	s	MOUNTED CIRCUIT BOARD, MA-183
203	A-1737-627-A	s	MOUNTED CIRCUIT BOARD, DET-52
204	A-1748-435-A	s	MICROPHONE UNIT ASSY
205	A-1748-439-A	s	3.5 INCH LCD ASSY
206	X-2187-184-5	s	COVER ASSY, MICROPHONE
207	1-542-748-11	s	MICROPHONE UNIT
208	1-965-713-11	s	HARNESS, SUB (KSW53-MA161)
209	1-965-715-11	s	HARNESS, SUB (KSW53-DET44)
210	1-965-716-11	s	HARNESS, SUB (KSW53-RM213)
211	1-966-994-11	s	HARNESS (DPR311-LCD)
212	3-080-203-31	s	SREW(M2),LOCK ACE,P2
213	3-080-206-21	s	SCREW, TAPPING, P2
214	3-086-368-31	s	SCREW (M1.4),LOCK ACE P2
215	3-276-867-01	s	PLATE, BLIND
216	3-276-871-01	s	BEZEL LCD
217	3-276-872-01	s	PACKING LCD
218	3-276-874-01	s	HINGE COVER TOP
219	3-276-878-02	s	LCD CABINET
220	3-278-640-01	s	SHEET PANEL BLIND
221	3-278-656-02	s	MIC SIDE GRILLE
222	3-278-657-01	s	CASE, MICROPHONE
223	3-278-658-01	s	HINGE COVER LOWER
224	3-278-660-01	s	MIC CUSION(R)
225	3-278-661-01	s	MIC CUSION(L)
226	3-278-662-11	s	HANDLE (MAIN)
227	3-278-668-01	s	HINGE
228	3-284-538-01	s	SHIELD SHEET(MIC)
229	3-968-729-52	s	SCREW (M2), LOCK ACE, P2
230	4-164-597-01	s	MA CUSHION

Inside Panel and Bottom Cover



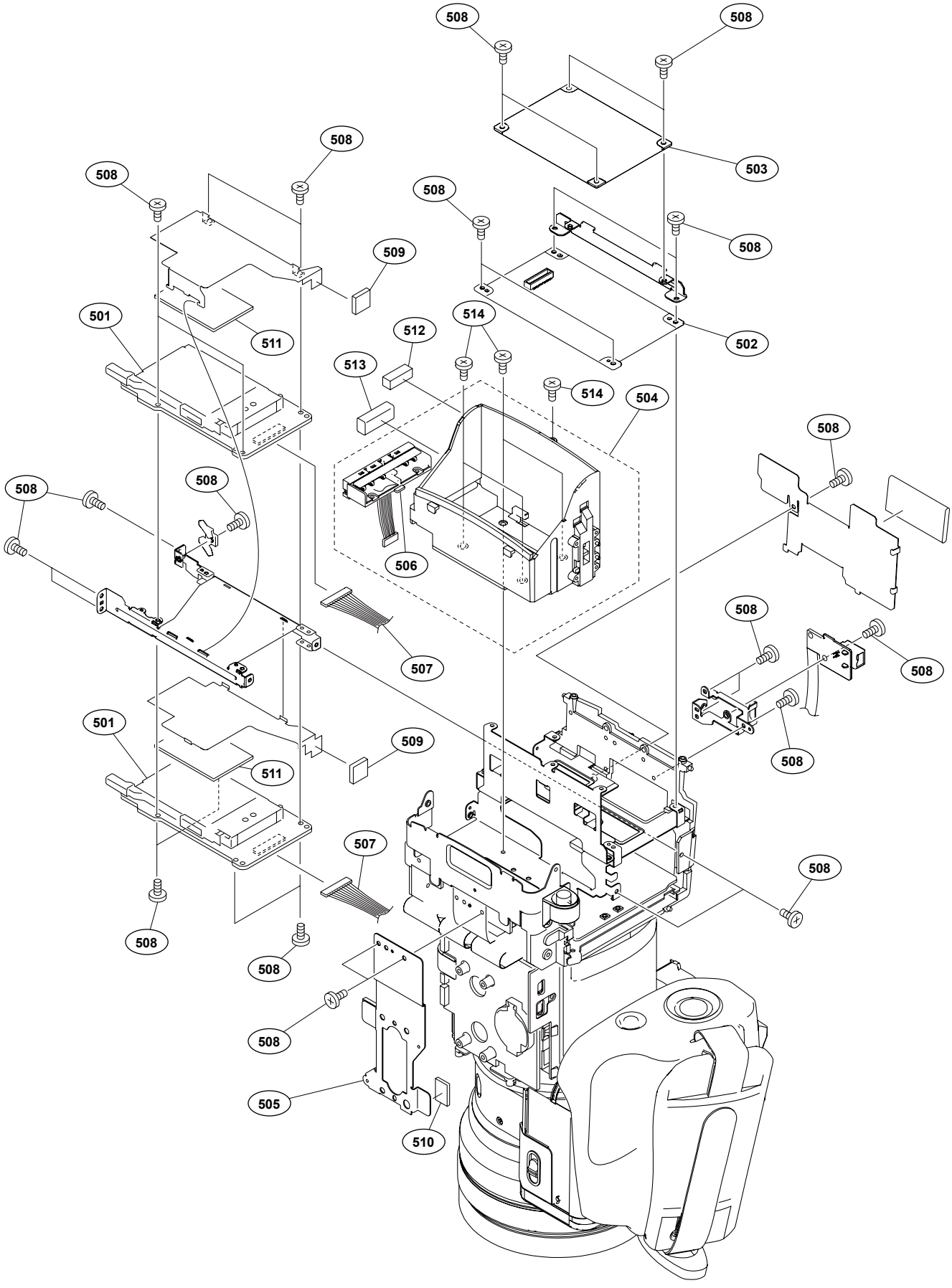
No.	Part No.	SP	Description
301	A-1748-440-B	s	INSIDE PANEL ASSY
302	⚠ 1-528-174-31	s	BATTERY, LITHIUM (CR2032 TYPE)
303	3-080-203-01	s	SREW(M2),LOCK ACE,P2
304	3-056-233-21	s	SREW(M2),LOCK ACE,P2
305	3-080-203-51	s	SREW(M2),LOCK ACE,P2
306	3-278-639-02	s	JACK COVER
307	3-288-392-01	s	WASHER (D), TRIPOD
308	3-604-795-01	s	CAP BNC
309	3-701-439-21	s	WASHER
310	3-968-729-52	s	SCREW (M2), LOCK ACE, P2
311	4-164-565-01	s	USB COVER
312	4-164-566-01	s	CASE(BOTTOM)L
313	4-164-567-01	s	CASE (BOTTOM)R
314	4-164-568-01	s	LID LITHIUM BATERY

Outside Panel and Rear Panel



No.	Part No.	SP	Description
401	A-1737-621-A	s	MOUNTED CIRCUIT BOARD, VIF-46
402	A-1737-625-A	s	MOUNTED CIRCUIT BOARD, DC-152
403	A-1737-629-A	s	MOUNTED CIRCUIT BOARD, LED-494
404	A-1737-630-A	s	MOUNTED CIRCUIT BOARD, SW-1484
405	A-1738-050-A	s	MOUNTED CIRCUIT BOARD, ASW-68
406	X-2515-728-1	s	REAR OUTSIDE PANEL SUB ASSY
407	1-480-457-21	s	BLOCK, AU VOLUME
408	1-487-628-11	s	SWITCH BLOCK
409	1-965-712-12	s	HARNESS, SUB (DC143-RE250)
410	1-966-991-11	s	HARNESS, SUB (TX131-VIF46)
411	1-966-992-11	s	HARNESS (TX131-VIF46)
412	1-966-993-11	s	HARNESS, SUB (ASW68-LED491)
413	1-966-995-12	s	HARNESS, SUB (VIF46-ASW68)
414	3-080-203-21	s	SREW(M2),LOCK ACE,P2
415	3-056-233-21	s	SREW(M2),LOCK ACE,P2
416	3-278-316-01	s	TAPE (C)
417	3-701-443-01	s	WASHER, 5
418	3-729-013-21	s	SCREW(M1.4X2.5),WASHERHEAD(+P)
419	3-968-729-52	s	SCREW (M2), LOCK ACE, P2
420	4-164-570-01	s	RELEASE BUTTON BT
421	4-164-572-01	s	COVER HDMI
422	4-164-586-01	s	HOLDER BELT
423	4-164-730-01	s	BRACKET DC JACK
424	⚠ 4-164-731-01	s	PANEL REAR
425	4-164-732-02	s	BUTTON (REAR) PUSH
426	4-164-733-01	s	RAIL (REAR) SLIDE
427	4-164-735-01	s	SWITCH (REAR (L)) SLIDE
428	4-164-736-01	s	SWITCH (REAR (H)) SLIDE
429	4-164-997-01	s	CAPACITOR BRACKET
430	4-644-493-11	s	ACE (M2.6), LOCK

Main Frame 1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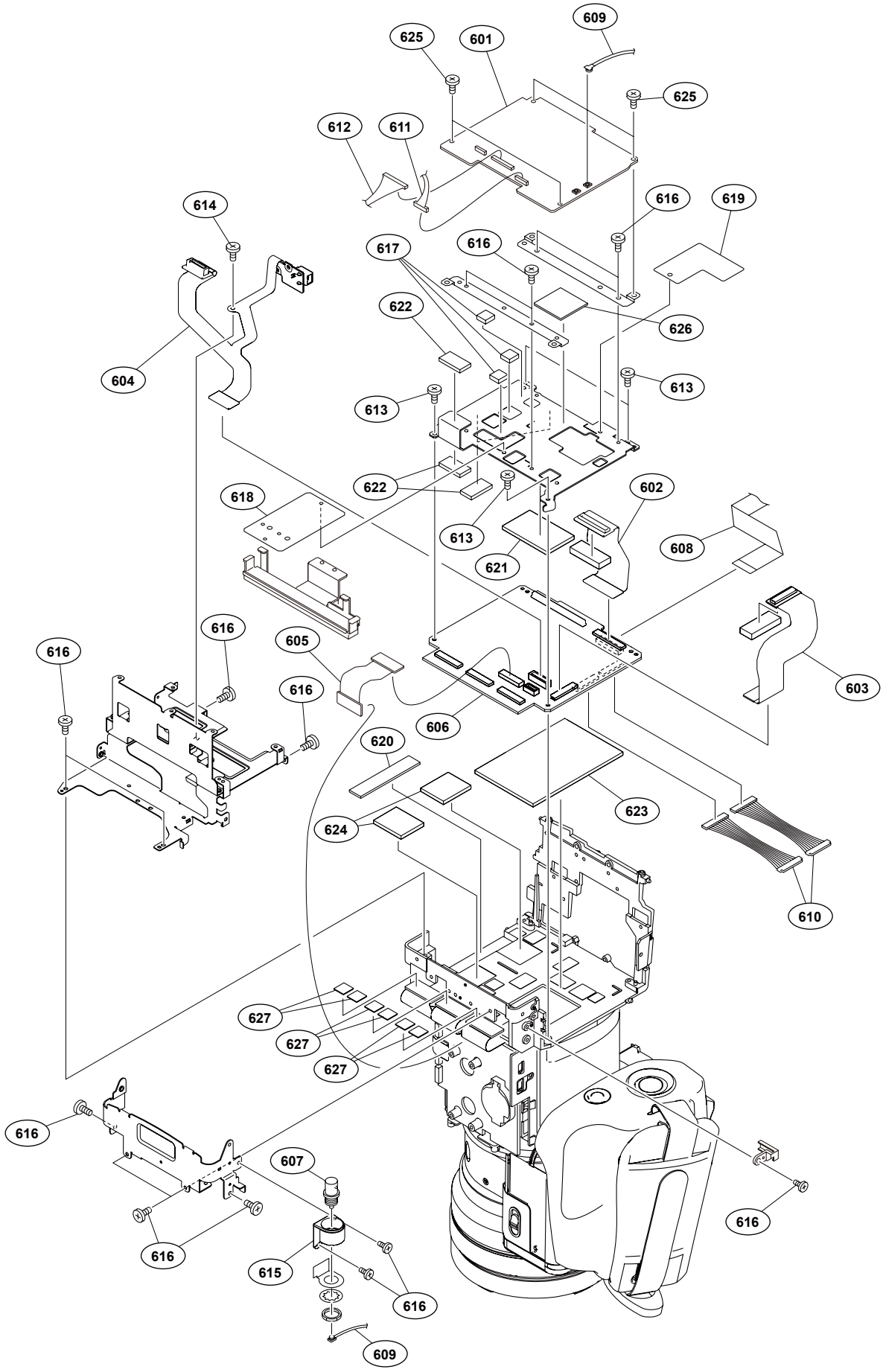
No.	Part No.	SP	Description
501	A-1737-580-A	s	MOUNTED CIRCUIT BOARD, EC-68
502	A-1738-054-A	s	MOUNTED CIRCUIT BOARD, RE-272
503	A-1738-055-A	s	MOUNTED CIRCUIT BOARD, RE-273
504	A-1748-437-B	s	BATTERY CASE ASSY
505	X-2515-748-1	s	SUPPORT BOTTOM ASSY
506	1-780-570-11	s	TERMINAL BOARD, BATTERY
507	1-966-990-11	s	HARNESS (DPR311-EC68)
508	3-968-729-52	s	SCREW (M2), LOCK ACE, P2
509	4-164-571-01	s	SHEET RADIATION 1.5 C
510	4-164-598-01	s	SHEET RADIATION BOTTOM
511	4-164-656-01	s	SHEET RADIATION 1 A
512	4-166-648-01	s	BATTERY CASE GASKET
513	4-170-734-01	s	INSIDE BOTTOM GASKET
514	3-080-203-31	s	SCREW (M2), LOCK ACE, P2

Main Frame 2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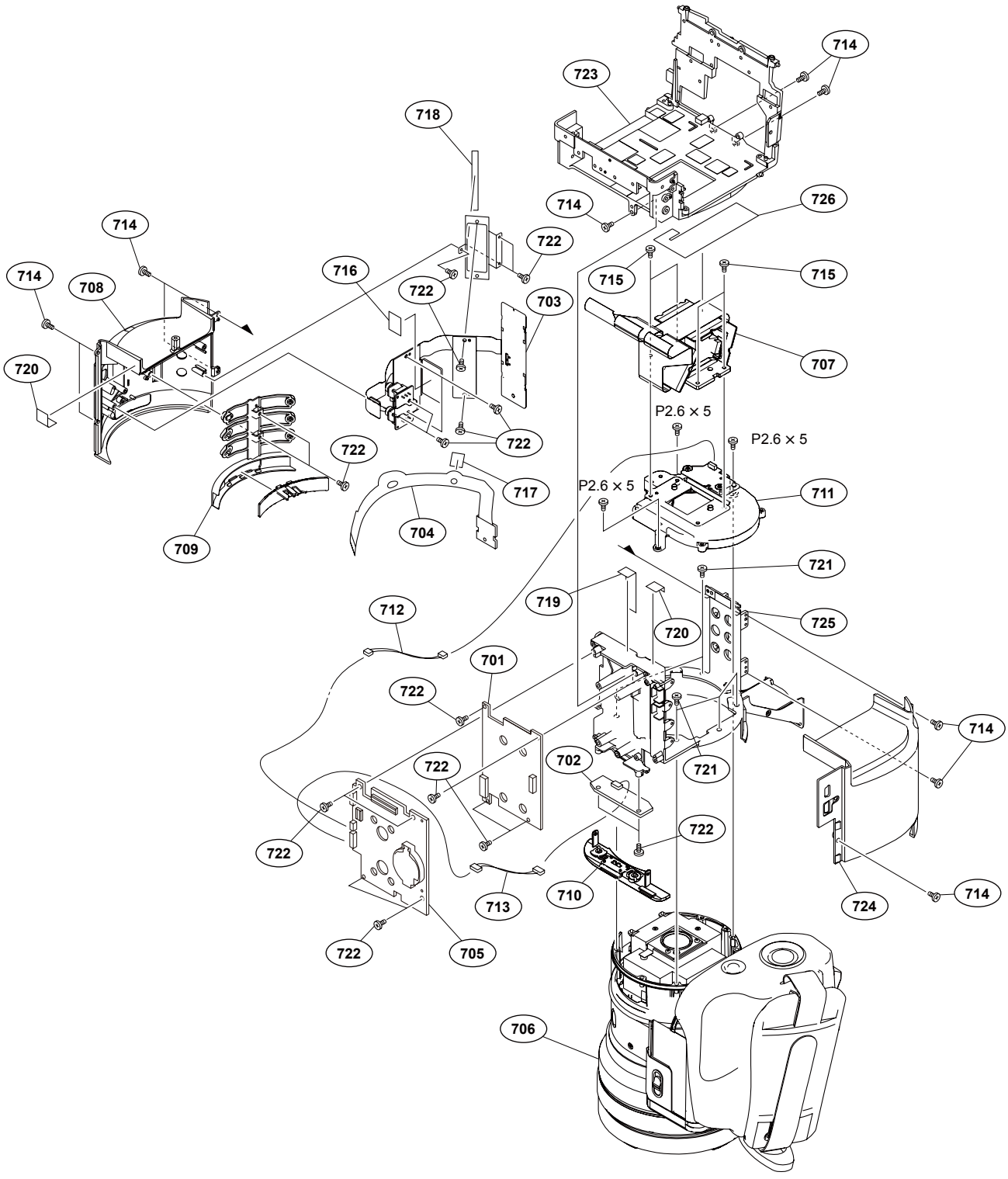
No.	Part No.	SP	Description
601	A-1737-576-A	s	MOUNTED CIRCUIT BOARD, TX-131
602	A-1737-577-A	s	MOUNTED CIRCUIT BOARD, CN-3258
603	A-1737-578-A	s	MOUNTED CIRCUIT BOARD, CN-3259
604	A-1737-579-A	s	MOUNTED CIRCUIT BOARD, CN-3273
605	A-1737-581-A	s	MOUNTED CIRCUIT BOARD, HN-356
606	A-1738-053-A	s	MOUNTED CIRCUIT BOARD, DPR-311
607	1-784-240-11	s	CONVERTER, COAXIAL CONNECTOR
608	1-837-283-11	s	CABLE, FLEXIBLE FLAT(30 CORE)
609	1-837-302-11	s	CABLE ASSEMBLY, COAXIAL
610	1-966-990-11	s	HARNESS (DPR311-EC68)
611	1-966-991-11	s	HARNESS, SUB (TX131-VIF46)
612	1-966-992-11	s	HARNESS (TX131-VIF46)
613	3-056-233-21	s	SCREW (M2), LOCK ACE, P2
614	3-080-203-01	s	SREW(M2),LOCK ACE,P2
615	3-278-727-01	s	BNC COVER
616	3-968-729-52	s	SCREW (M2), LOCK ACE, P2
617	4-164-571-01	s	SHEET RADIATION 1.5 C
618	4-164-619-01	s	SHEET HEAT TRANSFER MAIN
619	4-164-620-01	s	SHEET HEAT TRANSFER TOP
620	4-164-626-01	s	SHEET RADIATION 1.5 A
621	4-164-627-01	s	SHEET RADIATION 1.5 B
622	4-164-628-01	s	SHEET RADIATION 1.5 D
623	4-164-629-01	s	SHEET RADIATION 2 A
624	4-164-630-01	s	SHEET RADIATION 2 B
625	4-672-834-11	s	SCREW, +B EG GRIP
626	4-169-621-01	s	SHEET RADIATION 1 B
627	4-171-215-01	s	EMC FLEX SHEET

Front Block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722
705
706

No.	Part No.	SP	Description
701	A-1737-615-A	s	MOUNTED CIRCUIT BOARD, AU-326
702	A-1737-616-A	s	MOUNTED CIRCUIT BOARD, SW-1478
703	A-1737-617-A	s	MOUNTED CIRCUIT BOARD, SWC-50
704	A-1737-618-A	s	MOUNTED CIRCUIT BOARD, HN-360
705	A-1738-049-A	s	MOUNTED CIRCUIT BOARD, DAP-41
706	A-1759-650-A	s	UNIT, LENS
707	A-1759-651-A	s	UNIT, PRISM BLOCK
708	X-2187-375-4	s	CASE L ASSY
709	X-2187-376-1	s	BOTTON CASEL ASSY
710	X-2515-726-1	s	PANEL ASSY FRONT
711	1-788-703-13	s	ND FILTER, OPTICAL
712	1-965-711-11	s	HARNESS, SUB (SE912-AU313)
713	1-965-713-11	s	HARNESS, SUB (AU313-SW1375)
714	3-056-233-21	s	SCREW(M2),LOCK ACE,P2
715	3-080-206-21	s	SCREW, TAPPING, P2
716	3-281-730-01	s	SWC-47 ADHESIVE SHEET
717	3-281-751-01	s	SHEET, HN-338 ADHESIVE
718	3-284-472-01	s	CUSHION,ASSIGN
719	3-285-955-01	s	CMOS PROTECTION SHEET A
720	3-285-956-01	s	CMOS PROTECTION SHEET B
721	3-694-181-03	s	TYPE1,AROCK PRECISION +P2.6X5
722	3-968-729-52	s	SCREW (M2), LOCK ACE, P2
723	4-164-616-02	s	MAIN FRAME REAR
724	4-164-859-02	s	CASE (R)
725	4-164-878-01	s	FRONT FRAME
726	4-164-861-01	s	SHEET, C MOS FLEXIBLE
	7-627-556-57	s	PRECISION SCREW +P 2.6X5 TYPE1

5-3. Supplied Accessories

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--------------------
SUPPLIED ACCESSORIES
--------------------
 Ref. No.
 or Q'ty  Part No.    SP Description

 1pc      X-2546-633-1 s KIT,COLD SHOE
 1pc    ⚠ 1-479-570-14 s REMOTE COMMANDER (RM-F300)
 1pc    ⚠ 1-757-562-11 s CORD, POWER (UC)
 1pc    ⚠ 1-782-476-13 s CORD, POWER (CN)
 1pc      1-828-544-12 s CORD, CONNECTION (USB)

 1pc      1-829-414-22 s CABLE, CONNECTION (COMPONENT)
 1pc      1-831-553-22 s CORD, CONNECTION (AV MULTIPLE)
 1pc      3-278-903-01 s SHORUDER BELT
 1pc    ⚠ 4-130-649-04 s CD-ROM (UTILITY SOFTWARE)
 1pc    ⚠ 4-163-183-01 s MANUAL, INSTRUCTION (J)

 1pc    ⚠ 4-163-183-11 s MANUAL, INSTRUCTION (CE/E/UC)
 1pc    ⚠ 4-163-183-21 s MANUAL, INSTRUCTION (CN)
 1pc    ⚠ 4-164-150-01 s CD-ROM (INSTRUCTION MANUAL) (CE/E/UC)
```

Section 6
Block Diagrams

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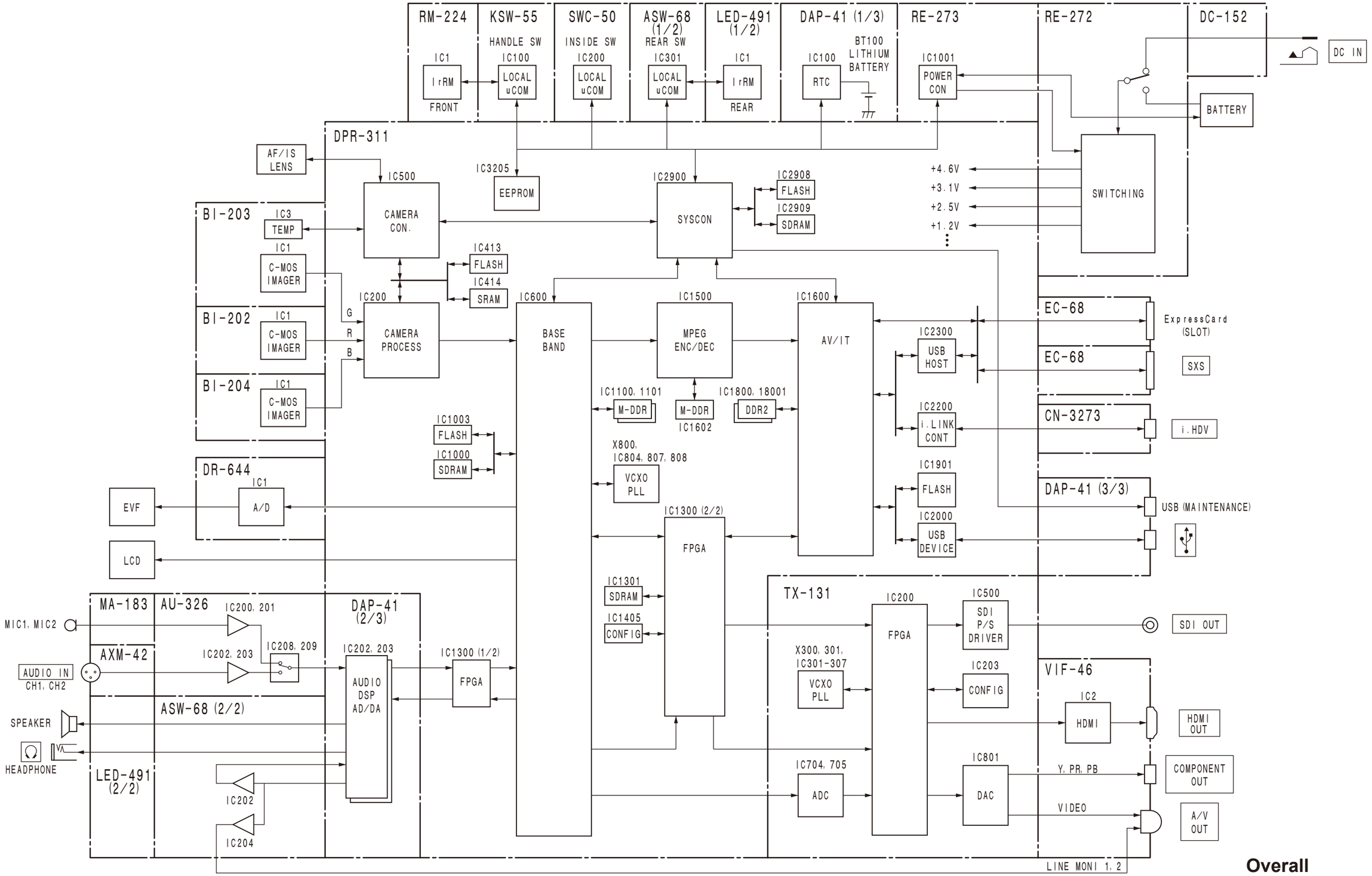
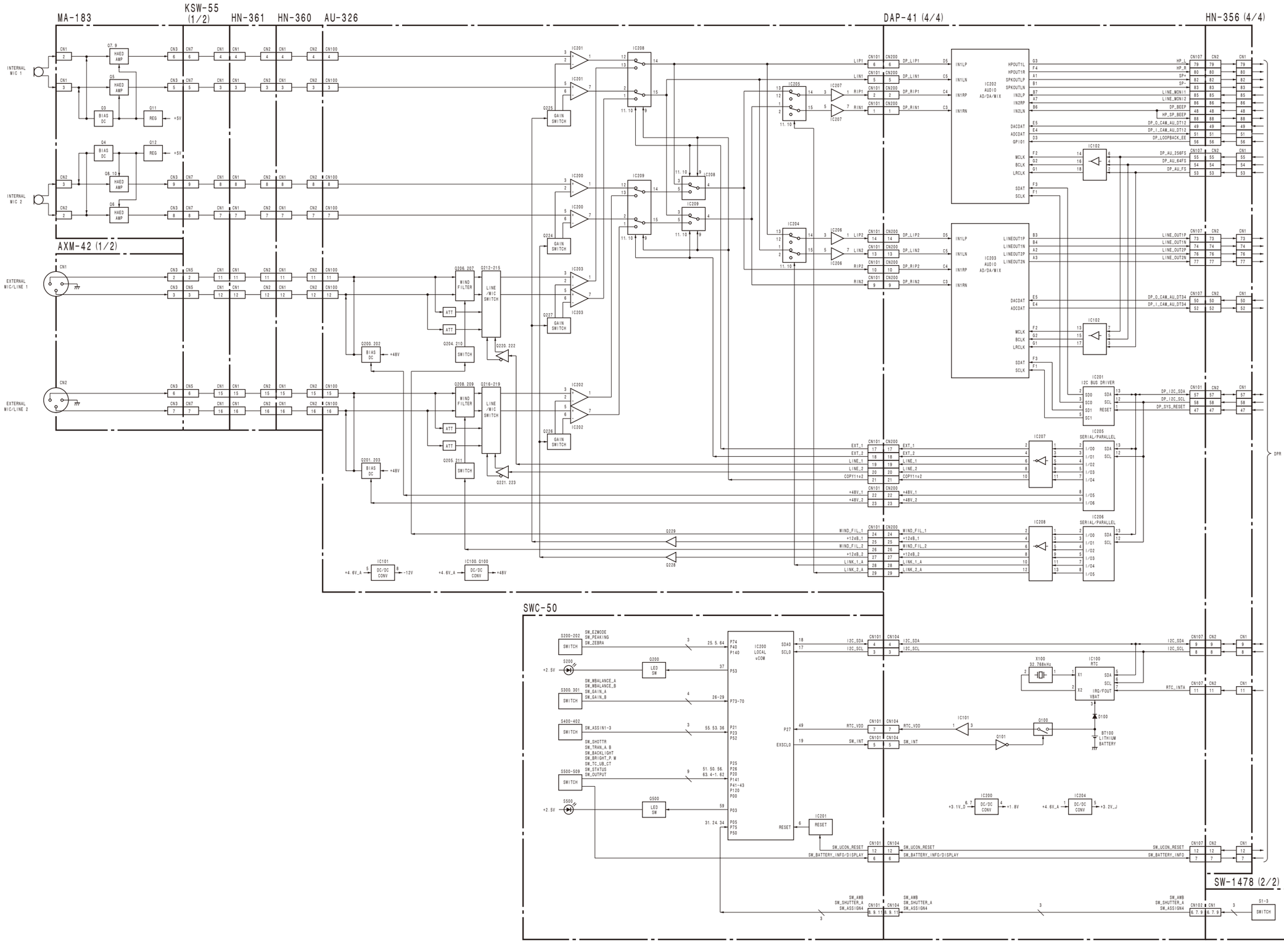

RM-224
IC1
IrRM
FRONT
KSW-55
HANDLE SW
IC100
LOCAL uCOM
SWC-50
INSIDE SW
IC200
LOCAL uCOM
ASW-68 (1/2)
REAR SW
IC301
LOCAL uCOM
LED-491 (1/2)
IC1
IrRM
REAR
DAP-41 (1/3)
IC100
RTC
BT100 LITHIUM BATTERY
RE-273
IC1001
POWER CON
RE-272
DC-152
DC IN
BATTERY
SWITCHING
DPR-311
AF/IS LENS
IC500
CAMERA CON.
IC3205
EEPROM
IC2900
SYSCON
IC2908
FLASH
IC2909
SDRAM
+4.6V
+3.1V
+2.5V
+1.2V
BI-203
IC3
TEMP
IC1
C-MOS IMAGER
BI-202
IC1
C-MOS IMAGER
BI-204
IC1
C-MOS IMAGER
G
R
B
IC200
CAMERA PROCESS
IC413
FLASH
IC414
SRAM
IC600
BASE BAND
IC1500
MPEG ENC/DEC
IC1600
AV/IT
IC1100, 1101
M-DDR
IC1602
M-DDR
IC1800, 18001
DDR2
IC1003
FLASH
IC1000
SDRAM
X800,
IC804, 807, 808
VCXO PLL
IC2300
USB HOST
IC2200
i.LINK CONT
IC1901
FLASH
IC2000
USB DEVICE
EC-68
ExpressCard (SLOT)
EC-68
SXS
CN-3273
i.HDV
DAP-41 (3/3)
USB (MAINTENANCE)
DR-644
IC1
A/D
EVF
LCD
IC1300 (2/2)
FPGA
IC1301
SDRAM
IC1405
CONFIG
TX-131
IC200
FPGA
IC500
SDI P/S DRIVER
SDI OUT
X300, 301,
IC301-307
VCXO PLL
IC203
CONFIG
VIF-46
IC2
HDMI
HDMI OUT
IC704, 705
ADC
IC801
DAC
Y, PR, PB
COMPONENT OUT
VIDEO
A/V OUT
MA-183
AU-326
IC200, 201
DAP-41 (2/3)
MIC1, MIC2
AXM-42
IC202, 203
IC208, 209
IC202, 203
AUDIO DSP AD/DA
IC1300 (1/2)
FPGA
AUDIO IN CH1, CH2
ASW-68 (2/2)
SPEAKER
HEADPHONE
LED-491 (2/2)
IC202
IC204
LINE MONI 1, 2

AU-326, AXM-42 (1/2), DAP-41 (4/4), HN-356 (4/4), HN-360, HN-361, KSW-55 (1/2), MA-183, SW-1478 (2/2), SWC-50



AUDIO
AU-326

AUDIO XLR
AXM-42 (1/2)

AUDIO codec
DAP-41 (4/4)

DPR-DAP relay board
HN-356 (4/4)

AU-HN relay board
HN-360

KSW-HN relay board
HN-361

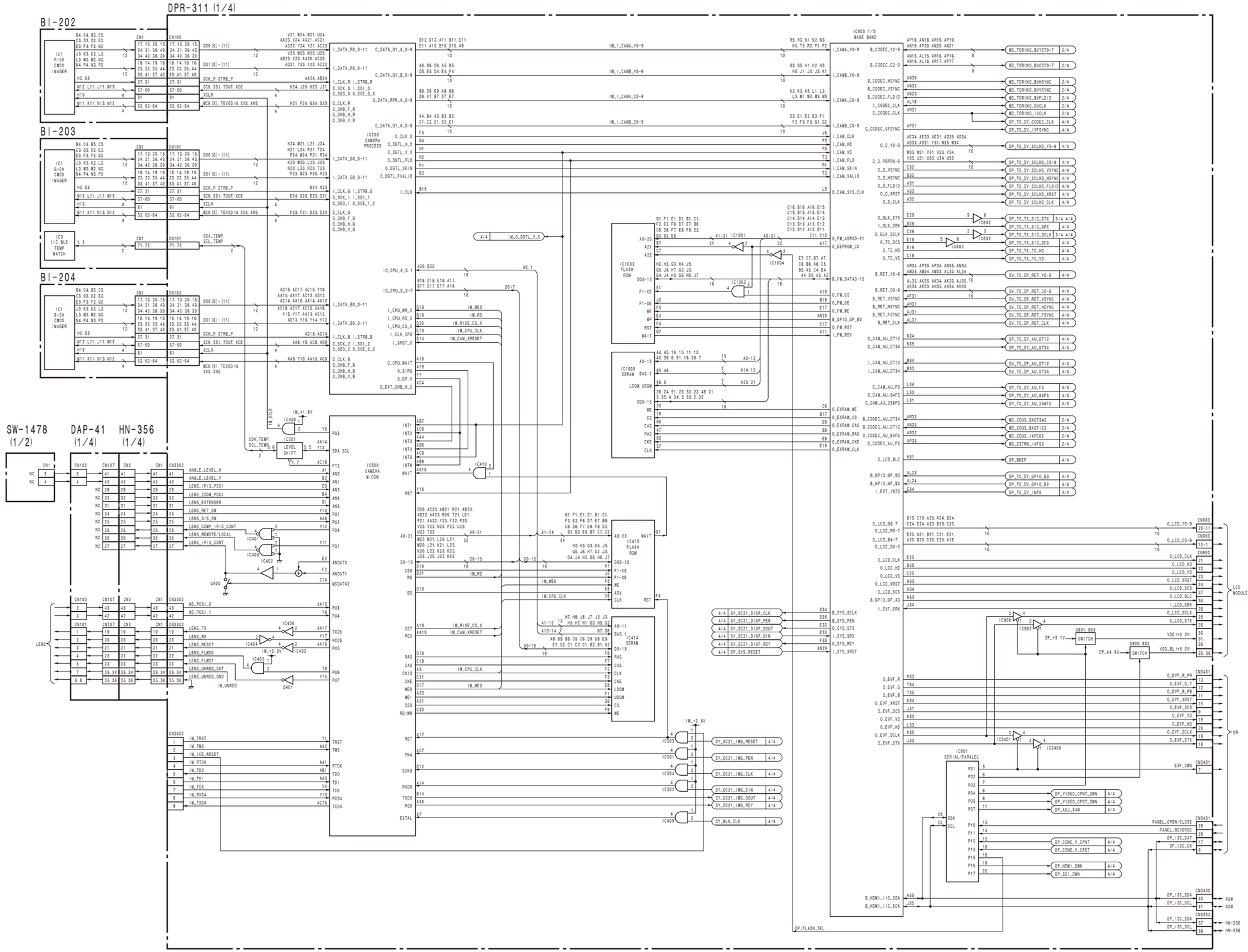
Handle switch
KSW-55 (1/2)

Internal MIC
MA-183

Front switch
SW-1478 (2/2)

Inside switch
SWC-50

BI-202, BI-203, BI-204, DAP-41 (1/4), DPR-311 (1/4), HN-356 (1/4), SW-1478 (1/2)



CMOS sensor
BI-202

CMOS sensor
BI-203

CMOS sensor
BI-204

AUDIO codec
DAP-41 (1/4)

Main board
DPR-311 (1/4)

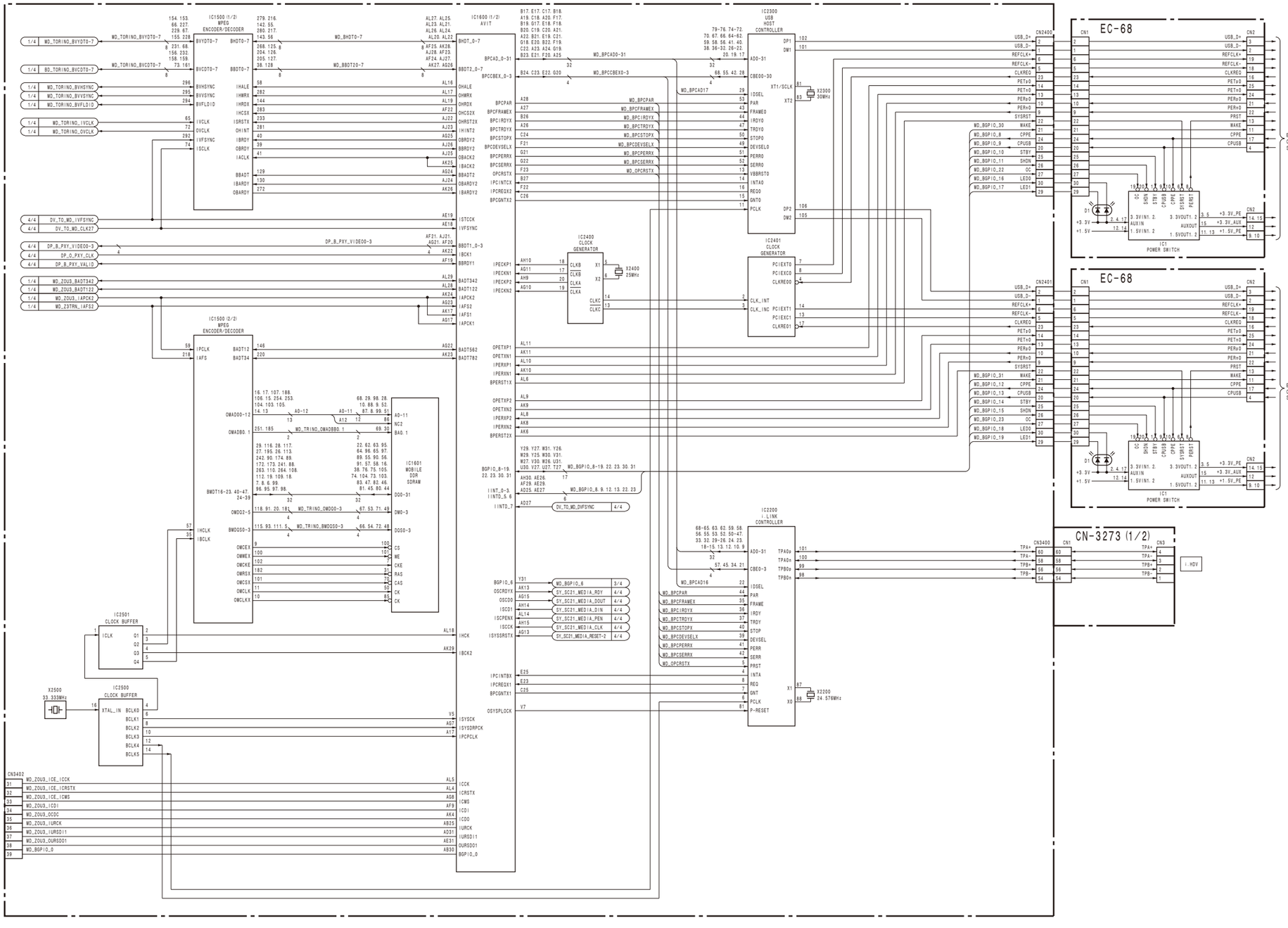
DPR-DAP relay board
HN-356 (1/4)

Front switch
SW-1478 (1/2)

6-4

CN-3273 (1/2), DPR-311 (2/4), EC-68

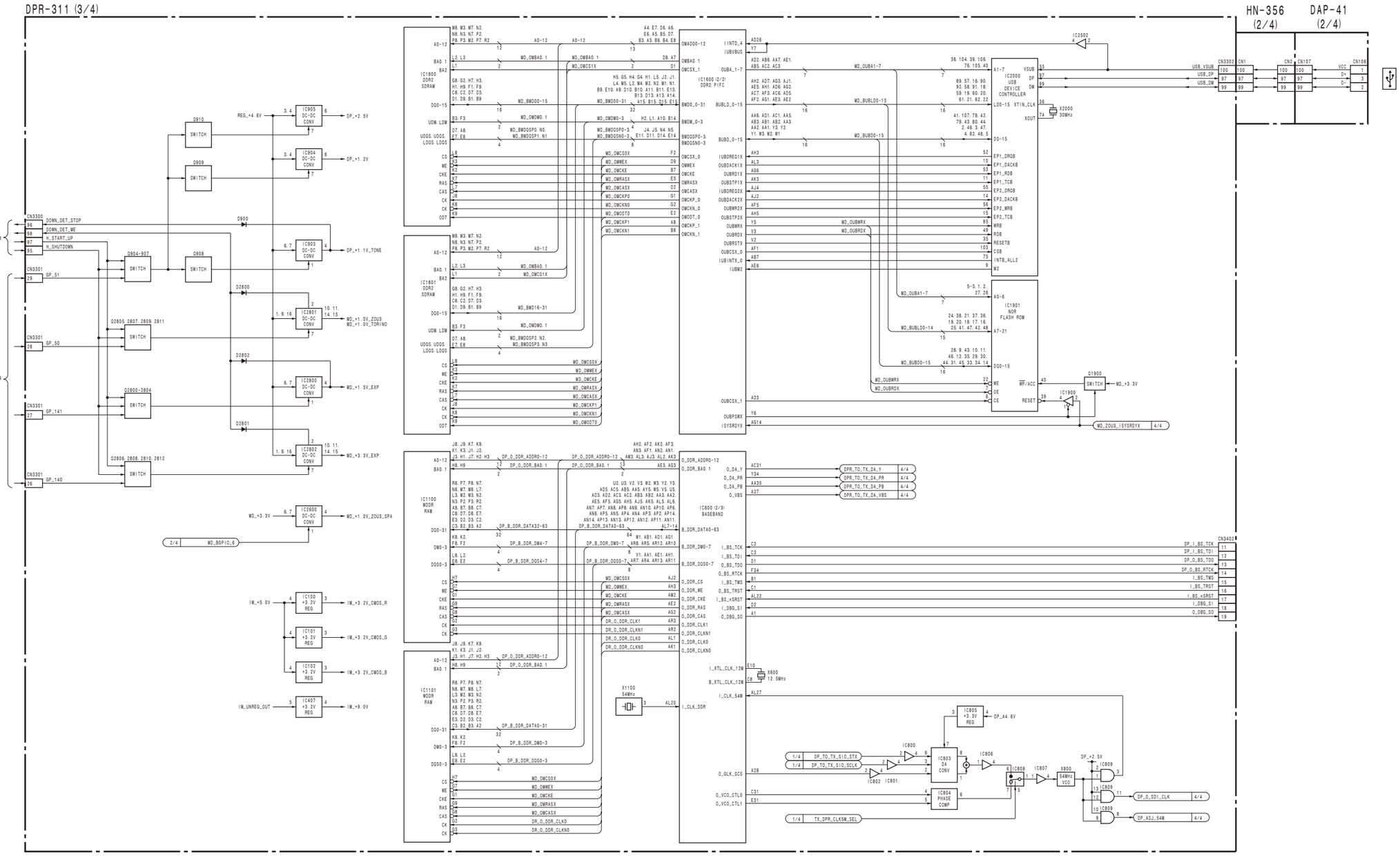
DPR-311 (2/4)



DPR-ASW relay board
CN-3273 (1/2)

Main board
DPR-311 (2/4)

ExpressCard slot
EC-68

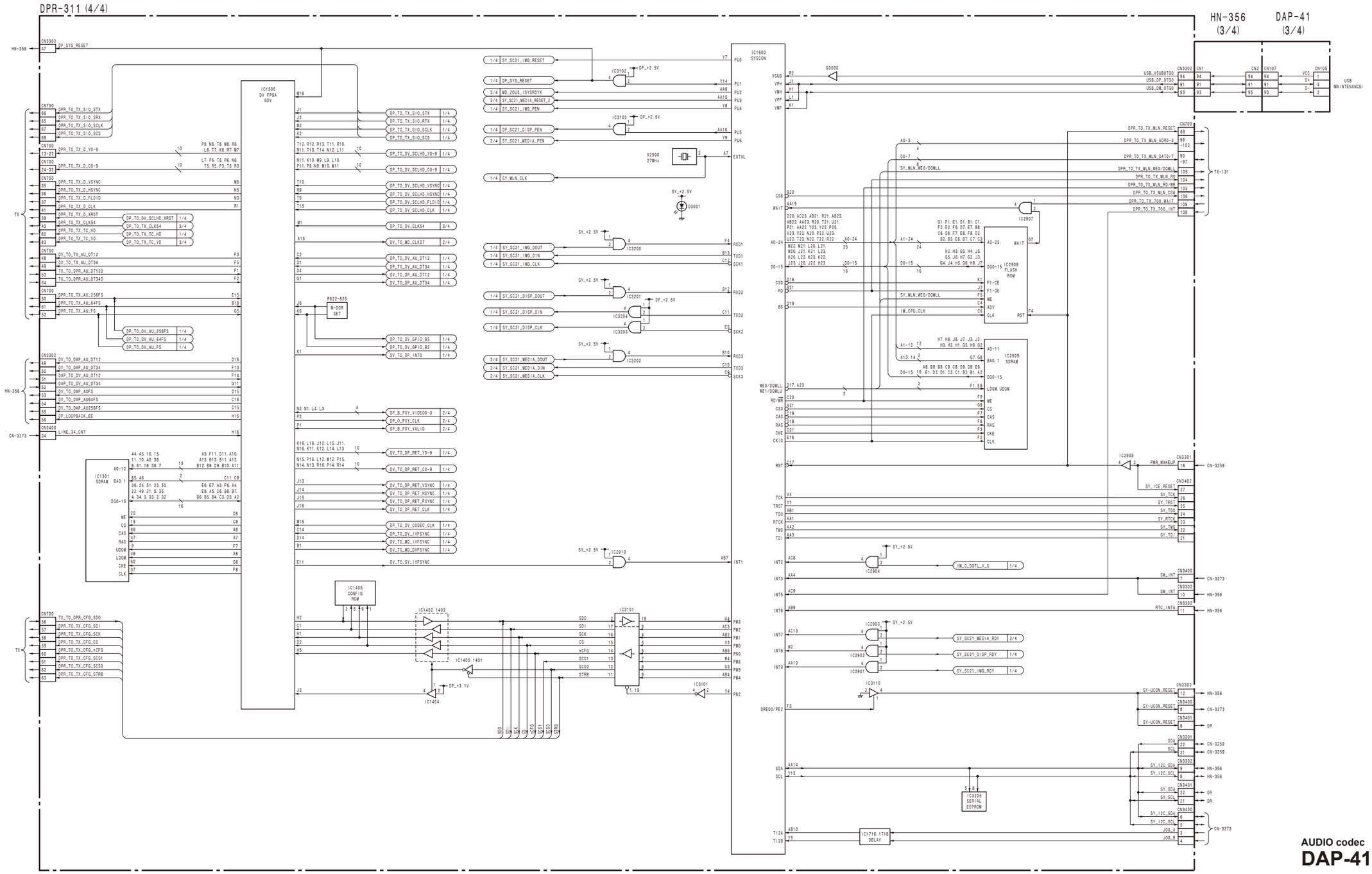


AUDIO codec
DAP-41 (2/4)

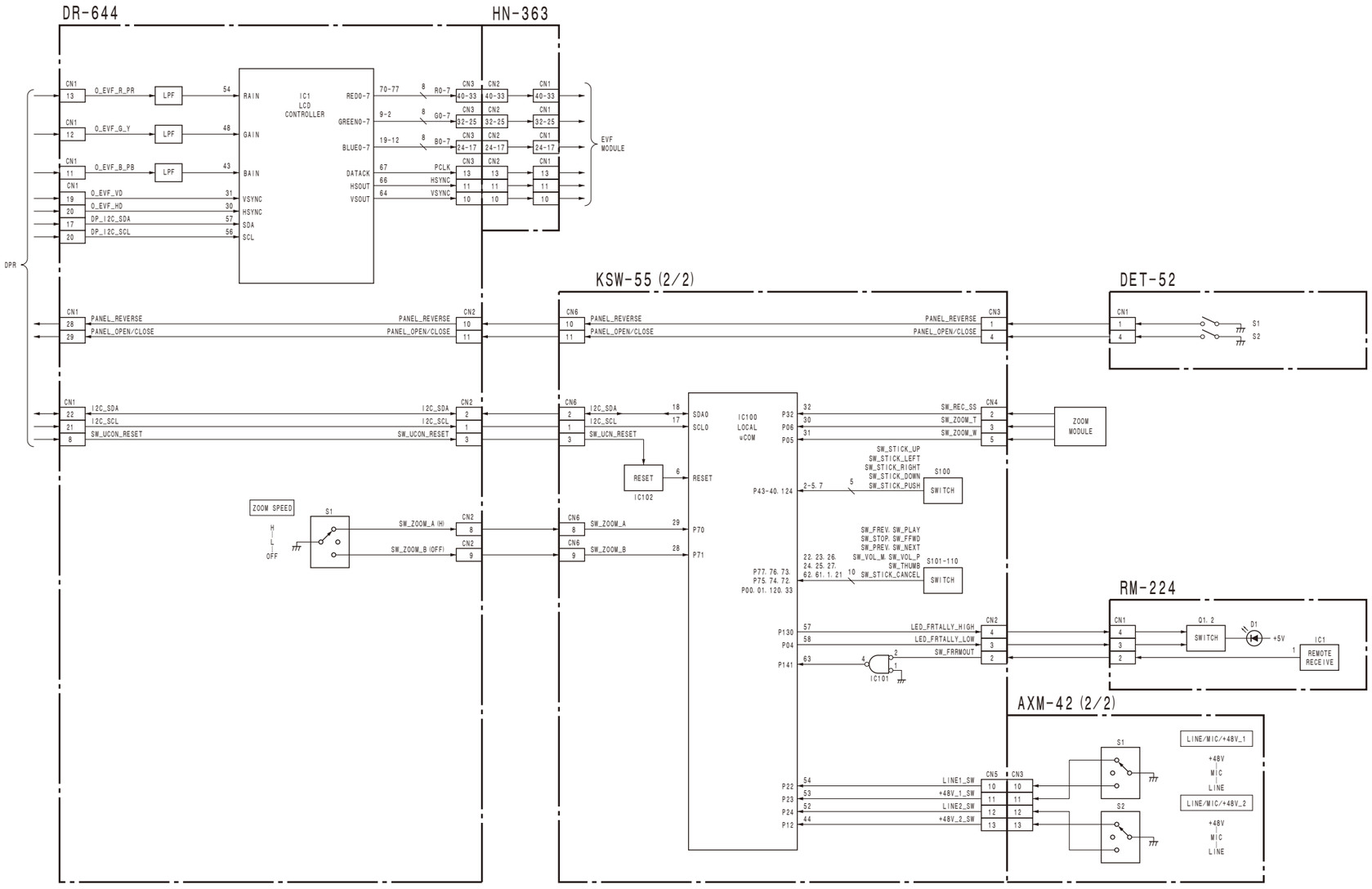
Main board
DPR-311 (3/4)

DPR-DAP relay board
HN-356 (2/4)

DAP-41 (3/4), DPR-311 (4/4), HN-356 (3/4)



AXM-42 (2/2), DET-52, DR-644, HN-363, KSW-55 (2/2), RM-224



AUDIO XLR
AXM-42 (2/2)

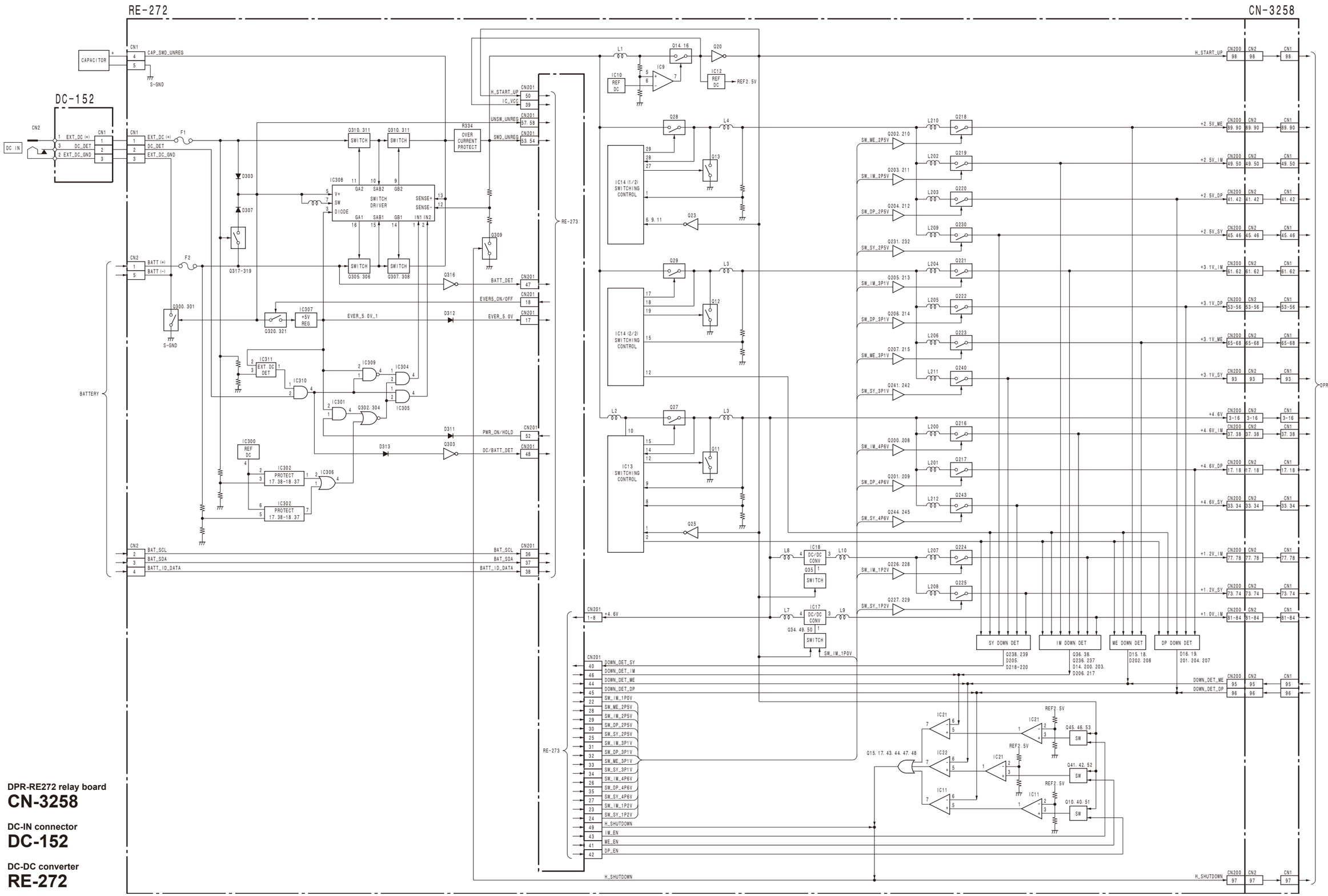
LCD switch
DET-52

EVF driver
DR-644

DR-EVF relay board
HN-363

Handle switch
KSW-55 (2/2)

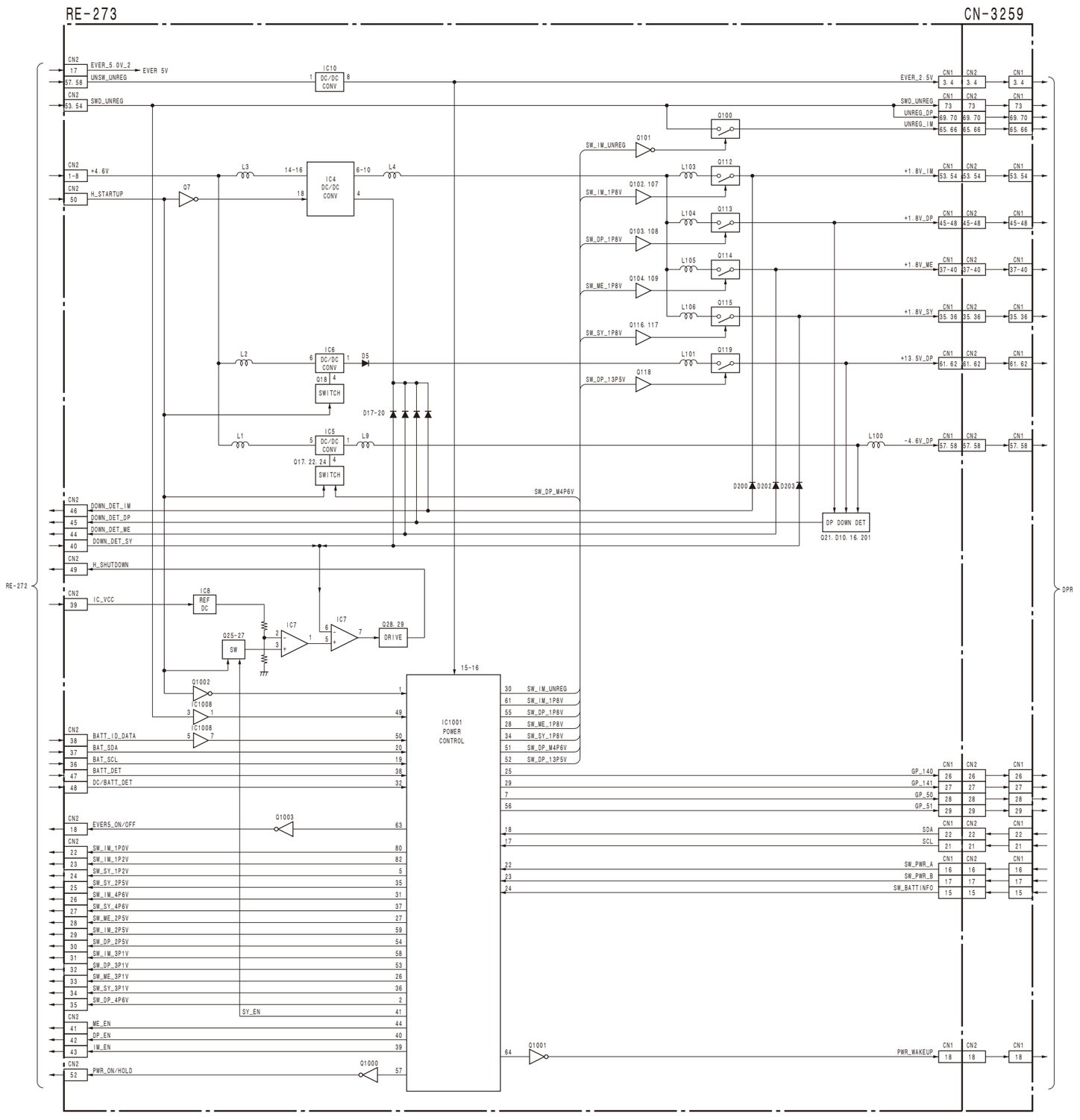
Remote receiver
RM-224



DPR-RE272 relay board
CN-3258

DC-IN connector
DC-152

DC-DC converter
RE-272

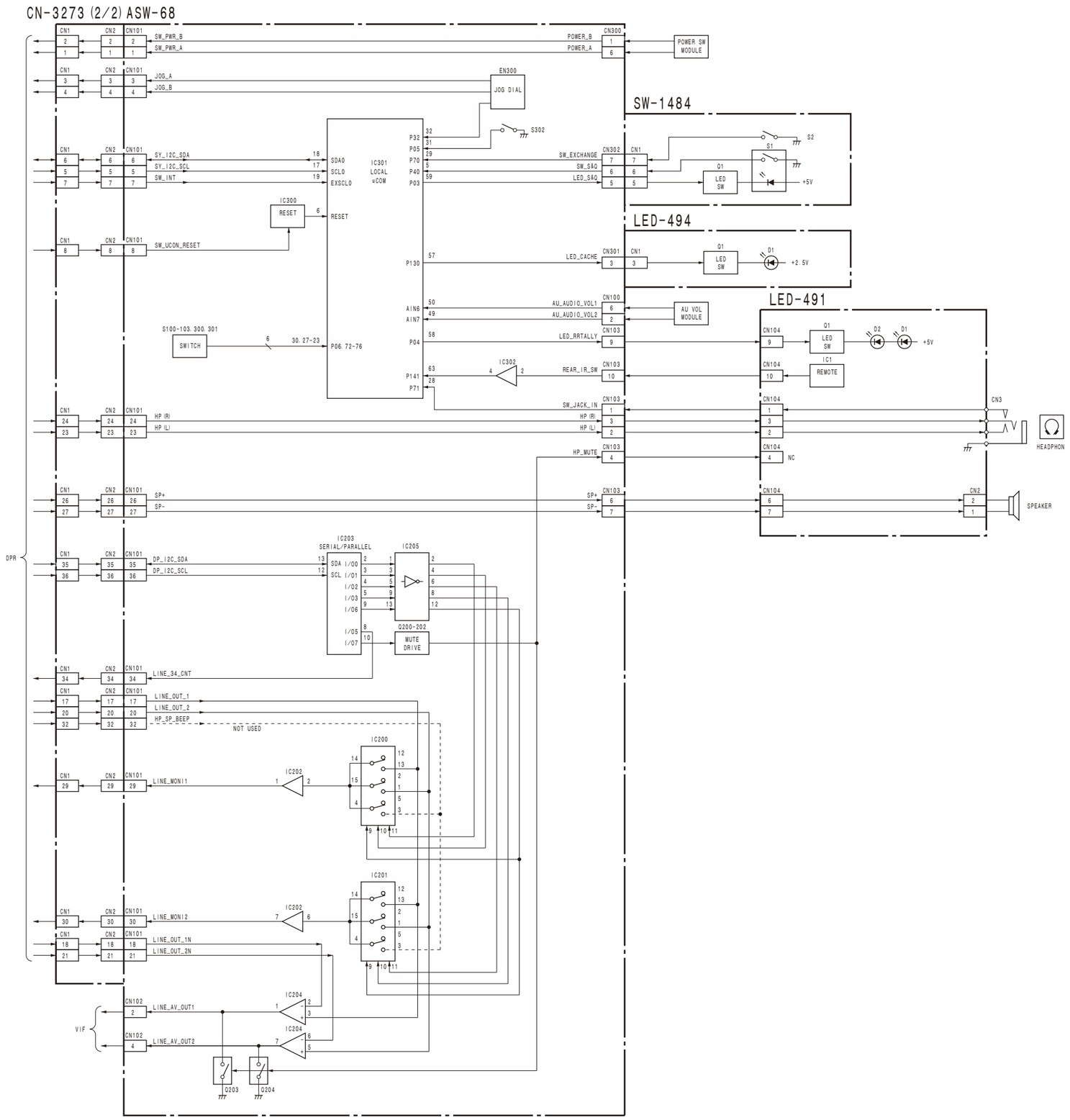


DPR-RE273 relay board
CN-3259

DC-DC converter
RE-273

PMW-EX1R

ASW-68, CN-3273 (2/2), LED-491, LED-494, SW-1484



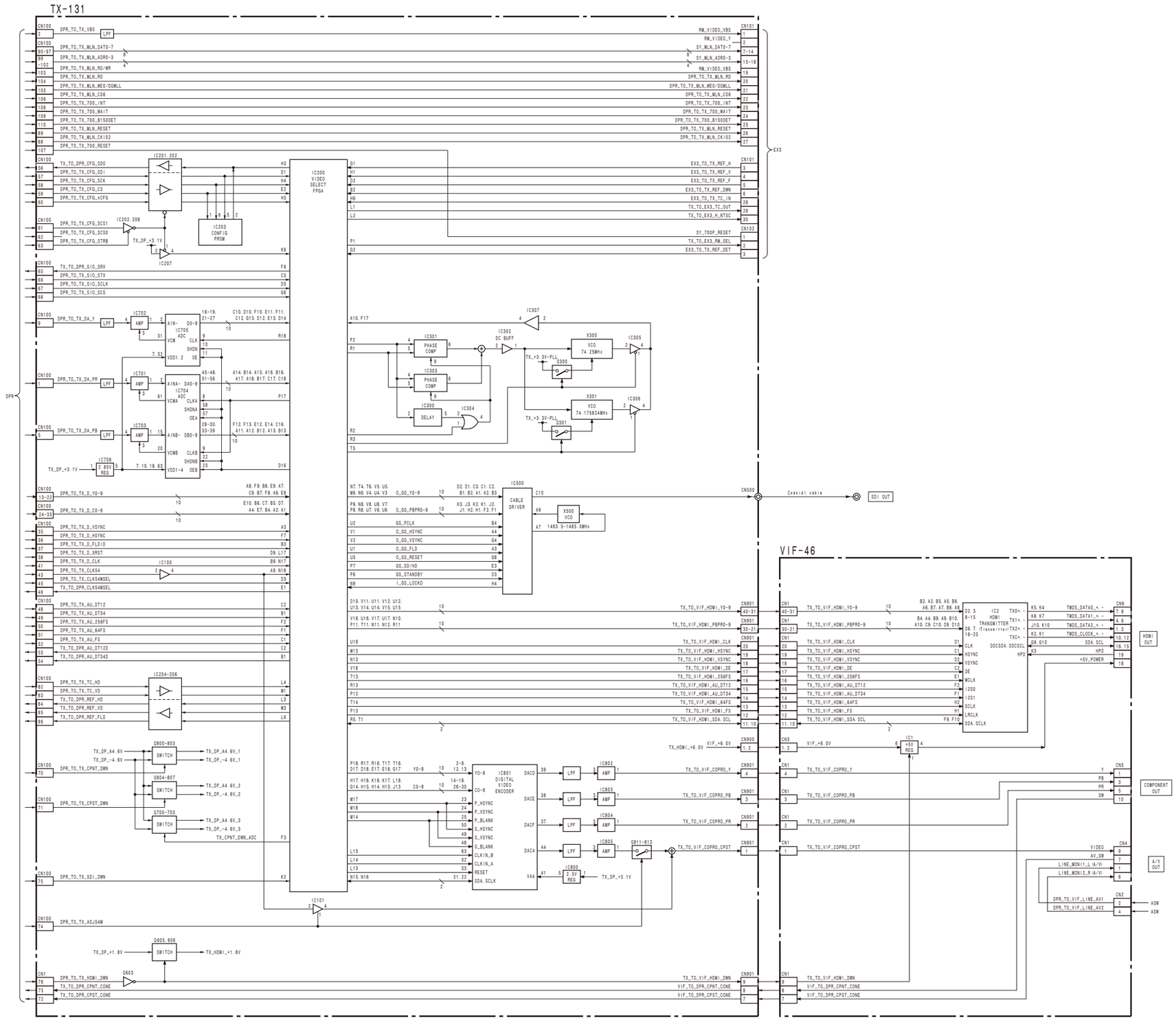
Rear panel switch
ASW-68

DAP-ASW relay board
CN-3273 (2/2)

Headphone
LED-491

LED CACHE
LED-494

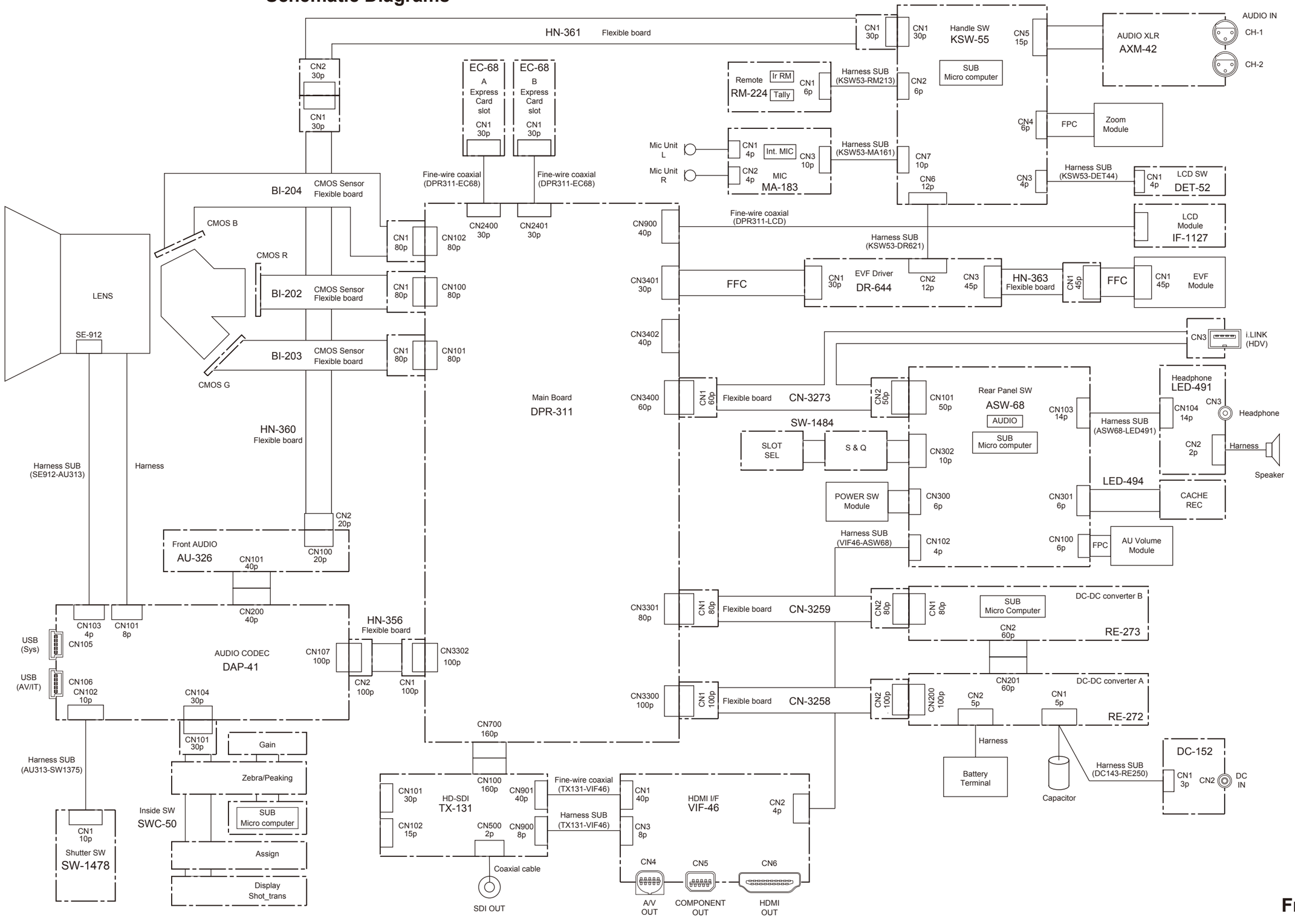
Switch
SW-1484



HD-SDI
TX-131

HDMI I/F
VIF-46

Section 7
Schematic Diagrams



PMW-EX1R (UC)
PMW-EX1R (E)
PMW-EX1R (J)
PMW-EX1R (CE)
PMW-EX1R (CN) J,E
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